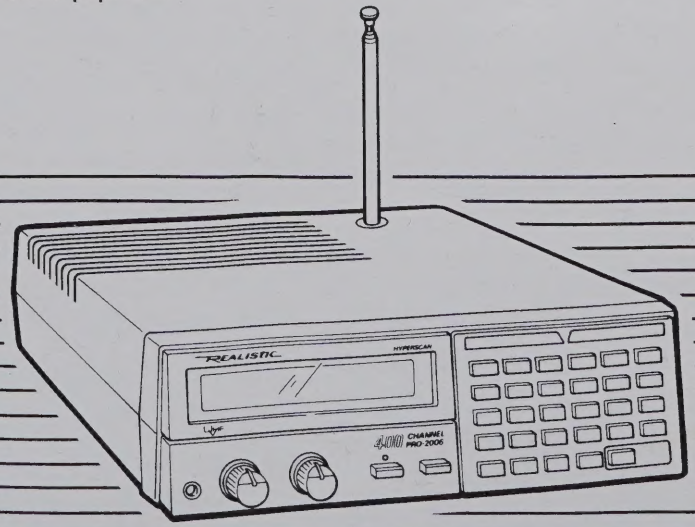
OWNER'S MANUAL

PRO-2006
Programmable Scanner

Please read before using this equipment



Cat. No. 20-145A

REALISTIC®

INTRODUCTION

Your new Realistic PRO-2006 Desk-Top Programmable Scanner lets you in on all the action! Your scanner gives you direct access to over 196,000 frequencies in nine action-packed radio bands including police, fire, ambulance, aircraft, ham radio, and transportation services, in addition to normal FM broadcasts, TV sound, and CB. You can select up to 400 channels for your scanner to scan through, and you can change your channel selection at any time.

The secret of your PRO-2006 scanner is a custom-designed microprocessor–a computer-on-a-chip–that allows you to instantly select any frequency without having to change any crystals. This microprocessor also gives your scanner special functions, such as:

Liquid Crystal Display–shows the channel and the frequency you have selected, as well as other information.

Two-Second Scan Delay– helps to prevent your losing replies on a channel while you are scanning.

Memory Backup–keeps the channel frequencies stored in your scanner's memory if a power failure occurs.

Lock-Out Function–lets your scanner skip over a specified channel or group of channels.

Ten Channel Storage Banks–allow you to group your stored frequencies so that calls are easier to identify.

Priority Channel–helps to keep you from missing important calls on the selected channel.

Direct Frequency Search–allows you to scan through every available frequency to find interesting broadcasts.

Monitor Banks–allows you to save up to ten additional channels located during a frequency search.

Sound Squelch–keeps the scanner from stopping on a channel that is only broadcasting a carrier, with no voice or other sound.

Your PRO-2006 scanner covers a wide frequency range:

- 25 – 520 MHz
- 760 – 823.945 MHz
- 851 – 868.945 MHz
- 896 – 1300 MHz

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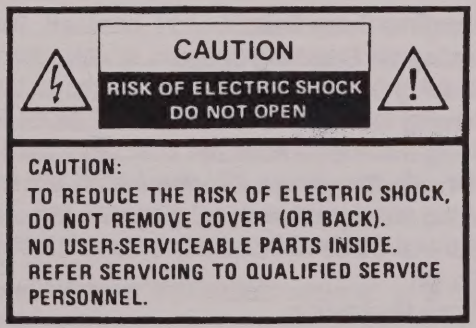


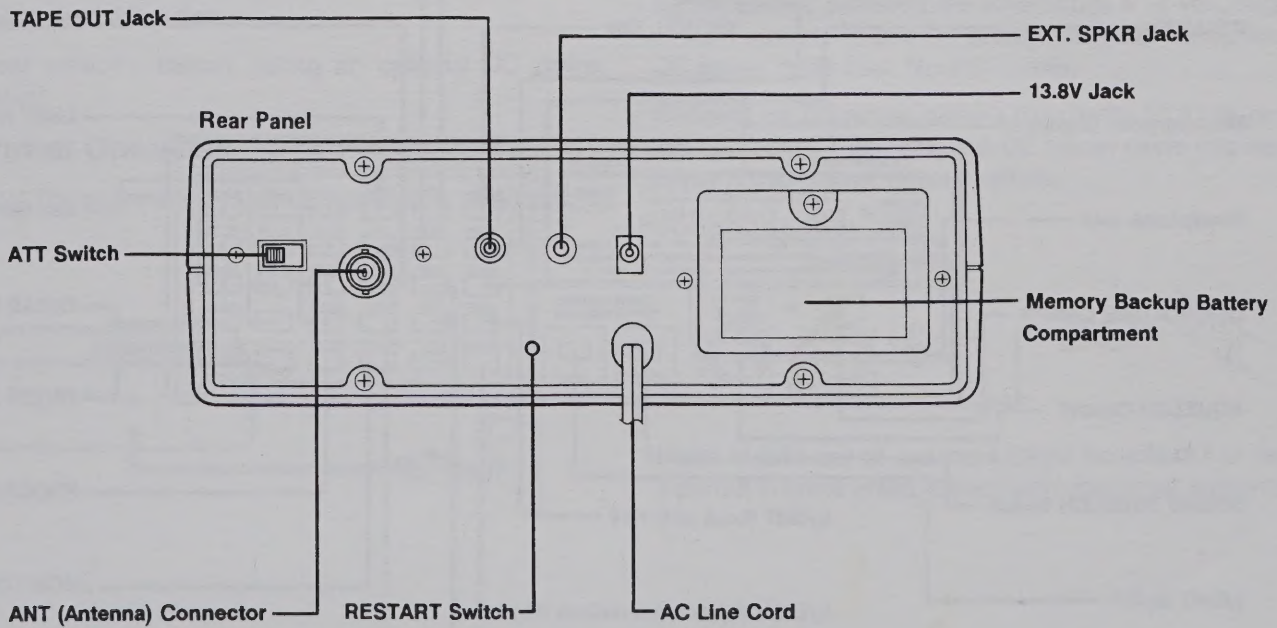
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS RECEIVER TO RAIN OR MOISTURE.

For your important records, please record your scanner's serial number in the box below. The serial number is located on the back panel of your scanner.

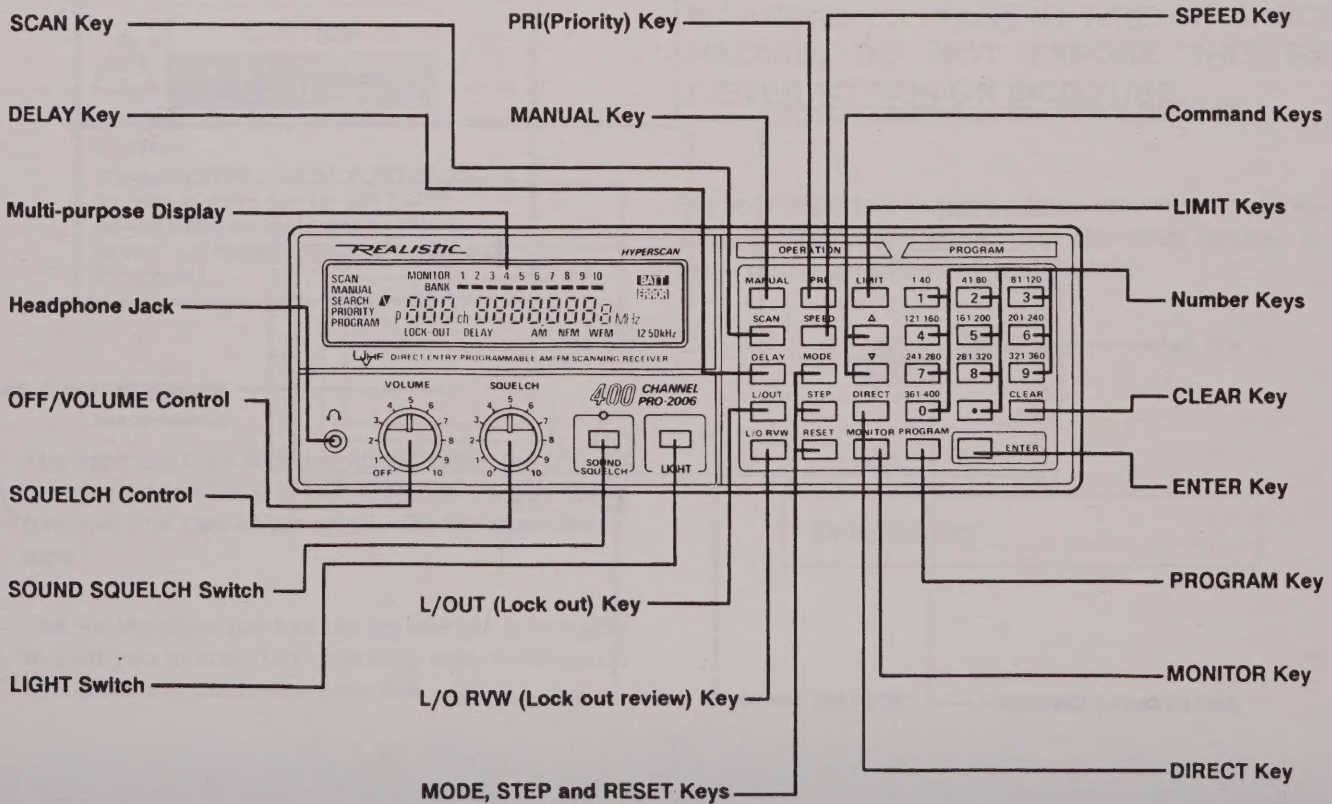
The lightning flash with arrowhead within the triangle is intended to alert you to dangerous voltage inside this unit that can cause shock. Do not open enclosure.

The exclamation point within the triangle is intended to alert you to important operating and maintenance instructions in this owner's manual.

Serial Number: _____


TAPE OUT Jack
EXT. SPKR Jack
13.8V Jack
Rear Panel
ATT Switch
Memory Backup Battery Compartment
ANT (Antenna) Connector
RESTART Switch
AC Line Cord

A QUICK LOOK AT YOUR SCANNER



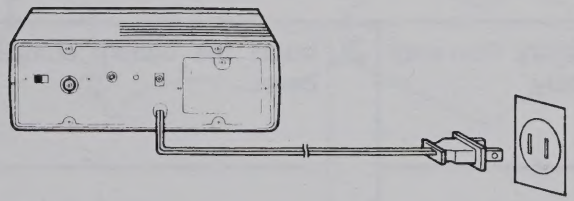
POWER SOURCES

You can power your scanner from the following sources:

- A standard AC outlet
- Your vehicle's battery (using an optional DC power cable)

AC Power Operation

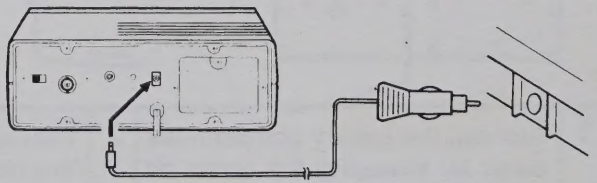
Connect the scanner's AC power cord to a standard AC outlet.



Car Battery Operation

You can power your scanner from your vehicle's cigarette lighter socket, provided the vehicle has a 12 volt, negative ground system. To use DC power, you need Radio Shack's DC power cable (Cat. No.270-1534B).

Connect the DC power cable's plug to the 13.8 volt jack on the rear panel. Then, plug the DC power cable into the cigarette lighter socket of your vehicle.



Note: Mobile use of scanners might be unlawful or require a permit in some areas. Check with your local authorities.

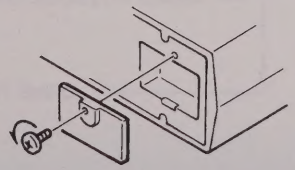
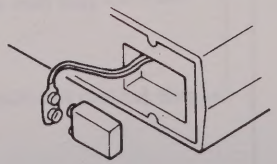
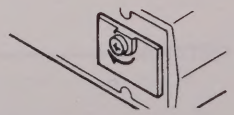
BATTERY INSTALLATION

Your scanner uses a 9-volt battery for memory backup. For longest operation and best performance, we recommend an alkaline battery, such as Radio Shack's Cat. No. 23-553. For best results, replace the battery every six months.

"BATT" flashes in the display and beeps sound when the battery is low or not installed. When this happens, replace or install the battery immediately.

Caution: Your scanner can keep channels stored in its memory for a few minutes even with the AC cord unplugged and the 9-volt battery disconnected. But, to avoid loss of memory information, do not unplug the scanner when replacing the battery.

In addition, never leave a weak or dead battery in your scanner; even "leakproof" batteries can leak damaging chemicals. Battery life is about six months when household AC power or automotive DC power is off for a prolonged period of time.

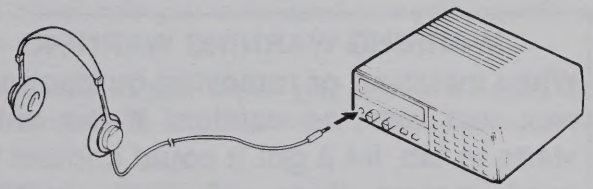
1	Remove the battery compartment cover by loosening the screw on the back panel.	2	Remove the old battery, then snap in a new 9-volt battery.	3	Install the battery compartment cover.
					

USING THE FOLDING FEET

Your scanner's front feet are folding type. Use them according to the location of the scanner.

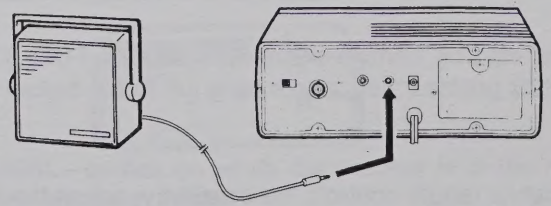
CONNECTING HEADPHONES

For private listening or in a noisy environment, plug headphones into the headphone jack on front of your scanner. Plugging in headphones automatically disconnects the internal speaker. We recommend Radio Shack's mono headset (Cat. No. 20-210).



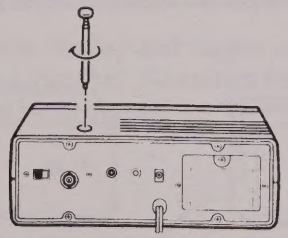
CONNECTING AN EXTENSION SPEAKER

In a noisy area, an extension speaker (such as Radio Shack's Cat. No. 21-549), positioned in the right place, might provide more comfortable listening. Plug the speaker cable's 1/8-inch mini-plug into your scanner's EXT SPKR jack.



CONNECTING THE ANTENNA

We have provided a telescoping antenna with your scanner. This antenna is adequate for strong local signals. To install it, simply screw it into the hole on the top of the scanner.



Antenna length controls the sensitivity: adjust the length of the telescoping antenna for best reception. Refer to the table below.

25 MHz–300 MHz	extend fully
300 MHz–520 MHz	extend 3 segments
760 MHz–1300 MHz	collapse fully (one segment only)

Your scanner has better reception when you attach a multiband outdoor antenna to it. Radio Shack stores sell a complete line of outdoor scanner antennas.

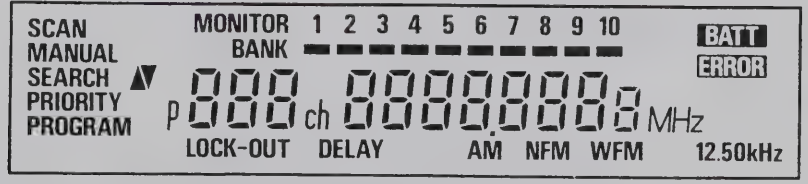
To install an outdoor antenna:

1. Select a location for the outdoor antenna that is as high as possible.
2. Following the instructions that came with the antenna and its mounting hardware, mount the antenna.
3. Connect the antenna to the scanner using coaxial cable. Always use 50 ohm coaxial cable. For lengths over 50 feet, use RG8 low-loss, dielectric coaxial cable.

WARNING WARNING WARNING

When installing or removing outdoor antennas, use extreme caution. If the antenna starts to fall, let it go! It could contact overhead power lines. IF THE ANTENNA TOUCHES THE POWER LINE, CONTACT WITH THE ANTENNA, MAST, CABLE, OR GUY WIRES CAN CAUSE ELECTROCUTION AND DEATH! Call the power company to remove the antenna. Do not attempt to do so yourself.

A LOOK AT THE DISPLAY



The display has several abbreviated indicators that show your scanner's current operating mode. A quick look at the display will help you understand how your scanner operates.

The above illustration shows your scanner's display with all the indicators on. The following is a brief explanation of the indicators.

BANK—bars to the right of this indicator show which memory banks are currently turned on for the scan mode. See "Understanding Channel Storage Banks and Search Banks."

SCAN—comes on when the scanner is in the scan mode.

DELAY—appears when the scanner is on a channel that you have programmed with the delay feature. See "Using the Delay Feature."

LOCK-OUT—appears when the channel you are listening to is locked out of the scan mode. See "Locking Out Channels."

MANUAL—comes on when the scanner is in the manual channel selection mode.

ch—digits preceding this indicator show which channel the scanner is currently tuned to.

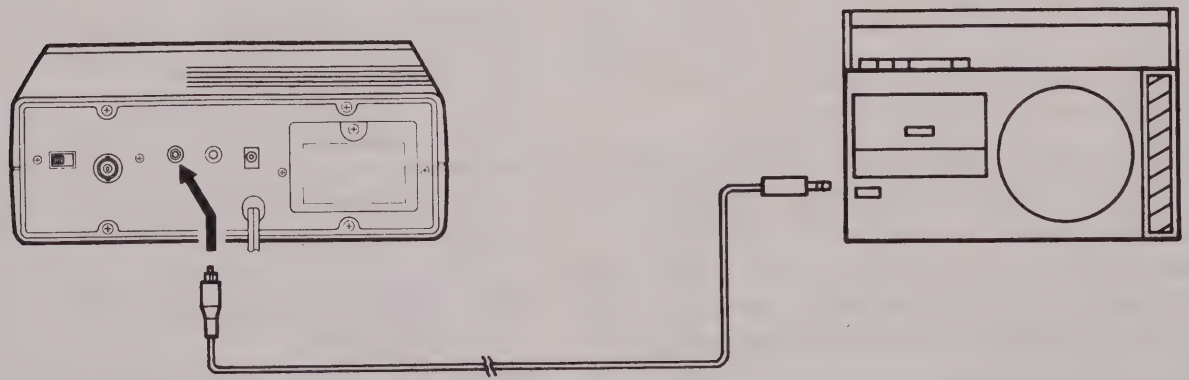
MHz—digits preceding this indicator show the frequency the scanner is currently tuned to.

MONITOR—appears when the scanner is in the monitor mode. See "Moving a Frequency from a Monitor Memory to a Channel."

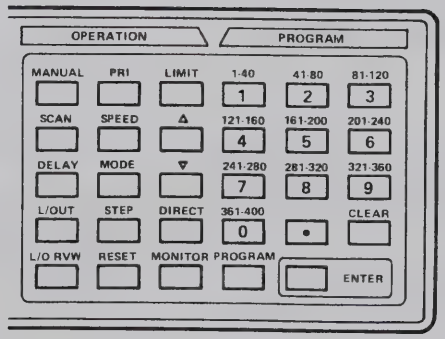
PRIORITY—appears when you have turned on the priority channel feature.

CONNECTING AN EXTERNAL TAPE RECORDER

You can record scanner transmissions with a tape recorder through the TAPE OUT jack. Consult your local Radio Shack store for the appropriate connecting cable.



A LOOK AT THE KEYBOARD



The keys on your scanner might seem cryptic at first, but a quick glance at this page should help you understand each key's function.

Number Keys—each have a single digit, and a range of numbers printed above it. The single digit is the number entered when you are entering a channel number or a frequency. The range of numbers (1-40, for example) shows the channels that make up a memory bank. See "Understanding Channel Storage Banks and Search Banks."

SCAN—causes your scanner to scan through the programmed channels.

MANUAL—stops scanning and allows you to directly enter a channel number.

CLEAR—deletes an incorrect entry.

L/OUT—turns on the lockout function. See "Locking Out Channels."

L/O RVW—recalls locked out channels sequentially.

DELAY—turns the delay feature on or off for the current channel.

SPEED—changes the scanning and search speed.

MONITOR—is used to access the monitor memories. See "Moving a Frequency from Monitor Memory to a Channel."

PRI—selects the priority channel.

PROGRAM—appears when the scanner is ready for programming.

BATT—flashes when the batteries need to be installed or replaced.

P—appears when you are listening to the priority channel.

SEARCH—appears during a limit search or a direct frequency search. ▲ and ▼ also appear in the display to show the direction of the search.

AM, NFM, WFM—shows which band mode is currently selected. See "Understanding Band Modes and Frequency Steps."

5, 12.5, 50—shows which frequency step is currently selected. See "Understanding Band Modes and Frequency Steps."

UNDERSTANDING CHANNEL STORAGE BANKS AND SEARCH BANKS

Your scanner can store up to 410 frequencies. You store each frequency in either a permanent memory, called a *channel*, or a temporary memory, called a *monitor*. The scanner has 400 channels and ten monitor memories.

To make it easier to identify and select the channels you want to listen to, channels are divided into ten groups of 40 channels. Each group of channels is called a bank. Perhaps the best way to explain the use of memory banks is through a practical example.

Suppose you want to monitor four different agencies: police, fire, ambulance, and aircraft. As a rule, each agency has several different frequencies they use for different purposes. The police might have four frequencies, one for each side of town. To make it easier to quickly determine which agency you are listening to, you could program the police frequencies starting with Channel 1 (Bank 1). Then, start the fire department on Channel 41 (Bank 2), ambulance service on Channel 81 (Bank 3), and aircraft frequencies on Channel 121 (Bank 4).

Now, when you want to listen to only fire calls, it is simple to turn off Banks 1 and 3 through 10 so that only Bank 2 is scanned. You could also use this feature to group the channels by city or by county. Simply press the number corresponding to the bank you want to turn on or off. The bar below the number in the display shows that bank is on.

Your scanner also has ten temporary monitor memories. You use these memories to store frequencies temporarily, while you decide whether to save them in one of the permanent channels. This is handy for quickly storing an active frequency when you are searching through an entire band. See "Searching for Active Frequencies."

When you are in the monitor mode, the ten numbers at the top of the display represent the ten monitor memories. The flashing number shows the current monitor memory.

In addition, your scanner has ten search banks. You can use these banks to store your selected limit search ranges. See "Searching for Active Frequencies."

PROGRAM—is used when programming frequencies into channels.

ENTER—used to enter the frequency when programming channels.

LIMIT, ▲, and ▼—are used during frequency searching. See "Searching for Active Frequencies."

DIRECT—starts the direct search.

MODE—changes the band mode in the following order: AM–NFM–WFM.

STEP—used to change frequency steps in the following order: 5 kHz–12.5 kHz–50 kHz.

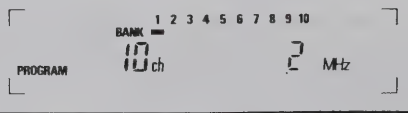
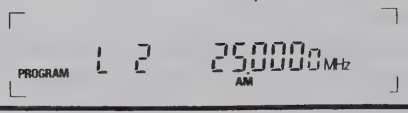
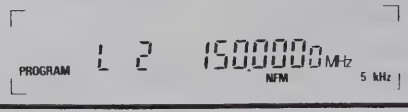
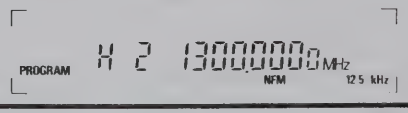
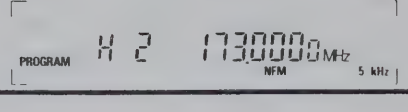
RESET—initializes band mode and frequency step.

SEARCHING FOR ACTIVE FREQUENCIES

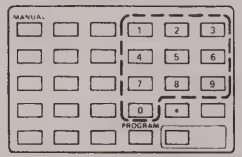
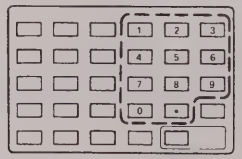
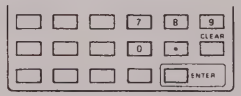
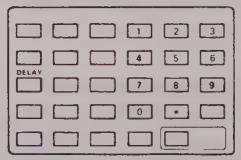
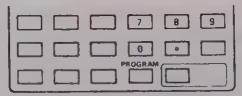
Use these procedures to search for a transmission. This is helpful if you do not have a reference to frequencies in your area. Also, see "Guide to the Action Bands" in this manual.

Limit Search

The limit search procedure allows you to search within a range of frequencies. You can store up to ten limit search ranges in the search banks.

1	Press [PROGRAM], and the search bank number in which you wish to store the limit search range. Press [0] for bank number 10.	
2	Press [LIMIT]. "L" and the search bank number appears in the display.	
3	Enter the lower limit of the frequency range. Then, press [ENTER].	
4	Press [LIMIT]. "L" changes to "H" in the display.	
5	Enter the upper limit of the frequency range. Then, press [ENTER].	

PROGRAMMING THE PRO-2006 SCANNER

1	Select a channel to program by pressing [MANUAL], and entering the channel number you want to program. Then, press [PROGRAM]. "PROGRAM" appears in the display to indicate that your scanner is in the programming mode.	
2	Enter a frequency. A good reference for active frequencies is Radio Shack *Police Call Directory Including Fire and Emergency Services*. We update this directory yearly, so be sure to get a current one. Also refer to "Reception Notes" and "Searching for Active Frequencies" in this manual.	
3	Press [ENTER]. This stores the frequency. If you made a mistake in Step 2, "Error" appears in the display and three beeps sound. Press [CLEAR] and proceed again from Step 2.	
4	Press [DELAY]. If you want your scanner to pause after each transmission before scanning to the next channel, press [DELAY]. "DELAY" appears in the display. If you do not want your scanner to pause, press [DELAY] again. "DELAY" disappears from the display.	
5	Repeat Steps 1–4 to program more channels. **NOTE:** If you want to program the next channel in sequence, just press [PROGRAM] and proceed to Step 2.	

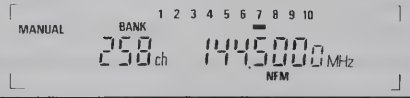
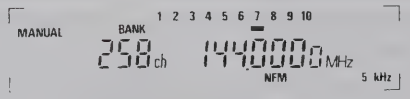
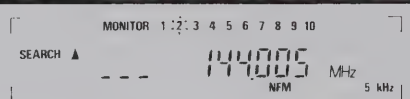
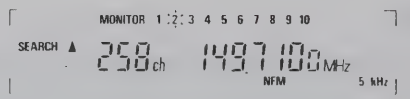
Limit-Search Memory

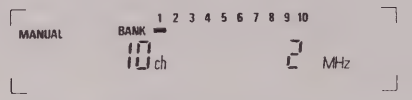
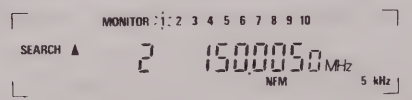
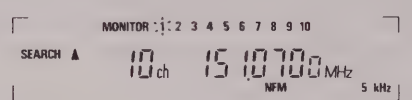
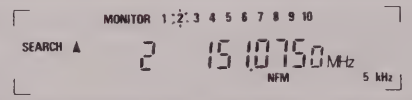
When you change your scanner's mode from limit search to manual, program, scan, direct search, and so on, your scanner retains the last frequency before you change the mode. Your scanner resumes the search from that frequency when you change the mode to limit search again.

Note: You can change the upper or lower limit frequency without affecting the memorized frequency if the frequency is within the new limit range. If the frequency is out of the new limit range, the search starts from the new upper or lower limit frequency.

Direct Search

When you are in program or manual mode, you can search up or down from the current frequency.

1	Select a currently programmed channel by pressing [MANUAL], and the channel number. Then, press either [MANUAL] or [PROGRAM].	
2	Press [DIRECT]. The step frequency appears in the display.	
3	Press [▲] to search through higher frequencies or [▼] to search through lower frequencies.	
4	When the search stops on a transmission, you can store that frequency into a monitor memory by pressing [MONITOR]. The memory number flashing on the display indicates the current memory number. To continue the search, press [▼] or [▲].	

6	Repeat steps 1–5 to store the limit-search range into the search banks. You can store up to 10 limit-search ranges.	
7	To recall a limit-search range, press the appropriate bank number.	
8	Press [▼] to search from the upper limit down to the lower limit. Or press [▲] to search upward starting from the lower limit.	
9	When the scanner stops on a transmission, press [MONITOR] to store the frequency in the current monitor memory. The memory number flashing on the display indicates the current monitor memory.	
10	To continue the search, press [▼] or [▲].	

Notes:

- Press [SPEED] to speed up or slow down the search.
- Press [DELAY] to make the scanner pause 2 seconds after a transmission, before proceeding to the next frequency.

UNDERSTANDING BAND MODES AND FREQUENCY STEPS

We designed your scanner to adjust itself for the band modes and frequency steps for each frequency range. Default settings are as shown below.

FREQUENCY VS. MODE AND STEP

FREQUENCY (MHz)	MODE	STEP (kHz)
25.000 – 29.995	AM	5
30.000 – 87.495	NFM	5
87.500 – 107.995	WFM	50
108.000 – 135.995	AM	12.5
136.000 – 224.995	NFM	5
225.000 – 520.000	NFM	12.5
760.000 – 1300.000	NFM	12.5

WFM: Wideband FM for normal FM broadcasts or TV sound.

NFM: Narrowband FM for action radio bands, police, fire, ambulance, ham radio, and so on.

AM: For aircraft band, CB, and so on.

Normally, the preset mode/step works within each band as shown above. However, for some of the ham radio, military aircraft (225–400 MHz), and TV audio (WFM) bands, you must change the mode or step manually. To change the band mode, press [MODE] when your scanner is in manual mode. To change the frequency step, press [STEP] in search mode. Note that when you change the preset modes/steps, the corresponding indicator flashes to show you that you changed the default setting.

When you want to return to the default setting, press [RESET]. The display stops flashing.

Keep in mind that improperly setting the modes or steps can cause poor reception. When you listen to an FM broadcast or TV sound in the NFM mode, the sound is very distorted. If you monitor police band in WFM mode, the sound is masked by noise. Or if you use 5 kHz or 12.5 kHz steps to search for FM broadcasts or TV sound, the search might stop on the sideband of the frequency. In that case, press [▲] or [▼] to get the center frequency. If you use 50 kHz steps for NFM band, you might miss the frequencies between the 50 kHz steps.

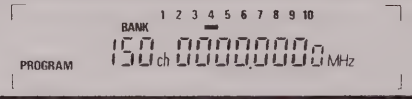
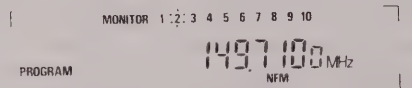
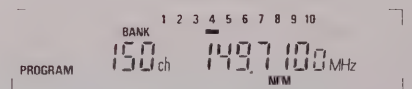
Notes:

- When you press [DIRECT] during limit, your scanner enters direct search mode.
- When you press a numeric key during a direct search, your scanner changes to limit search mode. The key you press corresponds with the limit-search bank number.

MOVING A FREQUENCY FROM A MONITOR MEMORY TO A CHANNEL

As you store frequencies in monitor memories, the memory number flashing on the display shows the current monitor memory. You can listen to monitor memories by pressing [MANUAL], [MONITOR], then the number of the monitor memory you want to listen to.

If there is a frequency you wish to transfer to a channel, follow this procedure to move it from the monitor memory:

1	Press [MANUAL], and the channel number in which you want to store the frequency. Then, press [PROGRAM].	
2	Press [MONITOR], and the memory number you want to move.	
3	Press [ENTER]. The scanner stores the frequency in the channel you entered.	

If you want to return to a limit search after this procedure, press [LIMIT], and the search bank number. Then, press either [▲] or [▼] to continue searching.

USING THE DELAY FEATURE

Many agencies use two-way radio systems that might have a period of several seconds between a query and a reply. To keep from missing a reply, program a delay on the channels you identify as operating this way. To program a delay, manually select the channel, and press [DELAY]. "DELAY" appears in the display. Now, when you are scanning through channels, your scanner pauses for two seconds after the completion of each transmission on that channel before resuming scanning.

Some radio systems, especially those above 800 MHz, use a special "trunked" system. In these systems, the transmitter selects an available frequency each time the operator keys the radio. Therefore, it is possible for the query to be on one frequency and the reply on another. To ensure the best possibility of hearing the full reply, you want the scanner to begin scanning immediately when the first transmission ends. In this case, select the channel manually and ensure that "DELAY" is not in the display. If "DELAY" is indicated, press [DELAY] to turn off this feature for that channel.

SETTING THE SCANNING SPEED

Your scanner has two different scanning speeds – 13 channels per second and 26 channels per second. To switch between the two scanning speeds, press [SPEED] during scanning.

LOCKING OUT CHANNELS

You can increase the effective scanning speed by locking out channels that you have not programmed. Manually select the channel, and then press [L/OUT], so that "LOCKOUT" appears in the display. This is also handy for locking out channels that have a continuous transmission, such as a weather channel. You can still manually select locked-out channels for listening.

To disable the lock-out function, manually select the channel and press [L/OUT]. Or, press [L/O RVW] in manual or program mode to call out locked-out channels one by one. Then, press [L/OUT] again.

Note: You can lock out as many channels as you like. But there must be at least one channel that you have not locked out in each bank.

USING THE RESTART SWITCH

The scanner's display might lock up the first time you plug in and turn on your scanner, or if the battery is left out for an extended period of time. If the display locks, use a pointed object, like a paper clip, to press and release the restart switch while power is on.

To clear all the memories, be sure the scanner is turned on and:

1. Press and hold [CLEAR].
2. Using a pointed object, press and release the restart switch.
3. After confirming that the display goes blank, release [CLEAR].

SETTING THE VOLUME AND SQUELCH

Turn VOLUME clockwise and SQUELCH counterclockwise until you hear a hissing sound. Then, slowly turn SQUELCH clockwise until the noise stops. Leave VOLUME set to a comfortable listening level.

If the scanner picks up unwanted weak transmissions, turn SQUELCH clockwise to decrease the scanner's sensitivity to these signals.

USING THE SOUND SQUELCH SWITCH

If the scanner stops at a transmission during scan, search, or priority modes, the [SOUND SQUELCH] switch lets the scanner start scanning again if the transmission contains no sound (carrier only without modulated signals).

If your scanner stops at a frequency that has no sound, press [SOUND SQUELCH]. The indicator lights. If the scanner detects no sound within 0.5 seconds, it goes to the next transmission.

When the scanner receives a frequency that contains sound, it halts at the frequency. If the sound ceases, the scanner stays on the frequency for 5 seconds, and resumes scanning. If the carrier stops, the scanner begins to scan immediately if the delay function is off, or after 2 seconds if the delay function is on.

To cancel sound squelch, press [SOUND SQUELCH] again. The indicator goes off.

Note: If a frequency contains a transmission with low modulation, the sound squelch circuit might not work properly.

SCANNING THE CHANNELS

To begin scanning channels, just press [SCAN]. Your scanner scans through all the channels that you have not locked out of the banks that are turned on. You must set SQUELCH so that you do not hear the hissing sound between transmissions. Be sure to read the following sections to get the full benefit from the special features of your scanner.

BIRDIES

Birdies are the products of internally generated signals that make some frequencies difficult or impossible to receive. If you program one of these frequencies, you hear only noise on that frequency.

If the interference is not severe, you might be able to turn SQUELCH clockwise to cut out the birdie. The most common birdies to watch out for are listed below.

Birdie Frequencies

(MHz)	(MHz)	(MHz)	(MHz)	(MHZ)	(MHz)
30.135	130.9375	342.000	851.875	1098.250	1245.850
45.200	144.135	342.800	854.375	1104.250	1248.650
48.045	155.125	366.000	856.875	1107.000	1260.000
51.230	185.450	366.750	867.9375	1109.750	1262.750
57.260	203.500	464.250	900.0625	1112.500	1265.500
59.500	208.000	465.250	902.5625	1125.000	1272.350
60.260	220.750	488.375	905.0625	1163.6875	1275.150
63.275	244.250	489.375	916.125	1166.4375	1277.950
69.300	249.750	500.4375	918.625	1169.1875	1280.750
72.315	250.500	501.4375	921.125	1203.3125	1288.400
75.330	278.4375	767.400	948.250	1206.0625	1291.200
78.330	279.1875	769.800	950.750	1208.8125	1294.000
79.800	298.0625	785.250	953.250	1224.200	1296.800
84.375	298.8125	803.550	1015.000	1227.000	
87.395	309.800	805.950	1017.500	1229.800	
122.375	310.600	815.600	1026.000	1232.600	
122.875	327.500	818.000	1052.750	1240.250	
130.4375	334.750	822.250	1088.875	1243.050	

CROSS MODULATION

When using an external antenna, a strong frequency close to the reception frequency might cause cross modulation (like cross talk). Set the ATT switch on the back panel to –10 dB to minimize cross modulation.

RECEPTION NOTES

Reception on the frequencies covered by your scanner is mainly "line of sight." That means you usually cannot hear stations at your listening location that are located beyond the horizon.

During summer months, you might be able to hear stations in the 30–50 MHz range located several hundred or even thousands of miles away. This is due to summer atmospheric conditions. This type or reception is unpredictable, but often very interesting!

One very useful service is the National Weather Service's continuous weather broadcasts. These broadcasts contain weather forecasts and data for the area around the station, plus bulletins on any threatening weather conditions. These stations use three frequencies: 162.40, 162.475, and 162.55 MHz. In most areas of the country, you can receive one of these frequencies.

TURNING BANKS ON AND OFF

As explained in "Understanding Channel Storage Banks and Search Banks" your scanner splits the 400 channels into ten banks of forty channels each. The small bars under the numbers at the top of the display are the bank indicators. You can turn each bank on and off, so that all the channels in a bank are either scanned or locked out. In scan mode, press the number key for the bank you want to turn on or off. If the bank indicator is on, you have turned on the bank and the scanner scans all the channels within that bank that you have not locked out. If the indicator is off, the scanner does not scan any of the channels within that bank. You can still manually select any channel in a bank, even if you have turned off the bank. You cannot turn off all banks – one must be turned on.

USING THE PRIORITY FEATURE

You can scan through all your programmed channels, and still not miss an important or interesting call on a specific channel. Simply program your desired channel as the priority channel, and turn on the priority feature by pressing [PRI] during scanning. The scanner now checks the priority channel every two seconds, and stays on the channel if there is activity.

To program a priority channel, simply press [PROGRAM], and the desired channel number. Then, press [PRI]. "P" appears in the display whenever the scanner is set to the priority channel. You can only program one channel as the priority channel. If you program a new channel as the priority channel, the previous channel you chose is automatically cleared.

Note: Channel 1 is automatically designated as the priority channel the first time you turn on your scanner.

MANUALLY SELECTING A CHANNEL

You can continuously monitor a single channel without scanning. This is useful if you hear an emergency broadcast on a channel and do not want to miss any of the details – even though there might be periods of silence – or if you want to monitor a channel that you have locked out. To select a channel to monitor, just press [MANUAL], and enter the channel number. Then, press [MANUAL] again. Or, if your scanner is scanning and has stopped at the desired channel, just press [MANUAL] once. Pressing [MANUAL] additional times causes your scanner to step through the channels one at a time.

USING THE LIGHT SWITCH

Press [LIGHT] to turn on or off the display's backlight. For longest backlight life, be sure to turn off the backlight when you do not need it.

TYPICAL BAND USAGE

The following is a brief listing of the typical services using the bands your PRO-2006 can receive. This listing can help you decide which ranges you would like to scan.

These frequencies are subject to change, and might vary some from area to area. For a more complete listing, refer to the *"Police Call Radio Guide Including Fire & Emergency Services."* at your local Radio Shack.

Abbreviations:

BA..... Remote Broadcast (Radio & TV)
CA.....General Mobile (Radio)
CAP ..... Civil Air Patrol
IB ..... Business
IF..... Forest Products
IM.....Motion Picture Industry
IP ..... Petroleum Industry
IS .....Special Industrial (Construction,farming,etc.)
IT..... Telephone Maintenance
IW .....Power and Water Utilities
IX ..... Manufacturers
IY ..... Relay Press (newspaper reporters)
LA ..... Automotive Emergency (tow trucks)
LJ..... Motor Carrier, Trucks
LR.....Railroad
LU.....Motor Carrier, Buses
LX..... Taxi
MC.....Maritime Limited Coast (private stations)
MG.....Maritime Government (Coast Guard)
MP..... Maritime Public Coast (marine telephone)
MS.....Maritime Shipboard
PF.....Fire
PH.....Highway Maintenance
PL.....Local Government
PM..... Medical Services
PO.....Forestry Conservation
PP..... Police
PS.....Special Emergency
RA..... Mobile Telephone (aircraft)
RC..... Mobile Telephone (radio common carrier)
RT..... Mobile Telephone (landline companies)
BIFC ..... Boise Interagency Fire Cache

Government Agencies:

UAF ..... Air Force
UAR .....Army
UBW..... International Boundary & ..... Water Commission
UCE.....Environmental Research Laboratories
UCF..... Maritime Fisheries Service
UCG ..... Coast Guard
UCM.....Maritime Administration
UCO ..... Ocean Survey
UCP.....National Capitol Police
UCW.....National Weather Service
UCX.....Department of Commerce
UEP ..... Environmental Protection Agency
UER..... Department of Energy
UFA .....Federal Aviation Administration
UFC..... Federal Communications Commision
UGC ..... Soil Conservation Service
UGF..... Forest Service
UGS .....General Services Administration
UGX ..... Department of Agriculture
UHW .....Dept. of Health and Human Services
UIB ..... Bonneville Power Administration
UIF ..... Bureau of Sport Fisheries and Wildlife
UIG..... Geological Survey
UII..... Bureau of Indian Affairs
UIL.....Bureau of Land Management
UIM .....Bureau of Mines
UIP ..... National Park Service
UIR.....Bureau of Reclamation
UIS .....Southwestern Power Administration
UIX ..... Department of the Interior
UNO..... United Nations
UNS ..... NASA
UPO ..... Postal Service
USA..... Federal Govt. Misc.
USD.....State Department
USN ..... Navy
UTC..... Bureau of Customs
UTM .....Bureau of the Mint
UTR..... Department of Transportation
UTV..... Tennessee Valley Authority
UTX..... Treasury Department
UVA..... Veterans Administration
UXX..... Classified

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GUIDE TO THE ACTION BANDS

With the right frequencies programmed into your scanner, you can monitor exciting events. With a little investigation, you can find active frequencies in your community. We can give you some general pointers, and you can take it from there. Please use caution and common sense when you hear an emergency call. Never go to the scene of an emergency – it could be the most dangerous thing you could ever do.

Find out if there is a local club that monitors your community's frequencies. Perhaps, a local electronics repair shop that works on equipment similar to your scanner can give you channel frequencies used by local radio services. A volunteer police or fire employee can also be a good source of this information.

As a general rule on VHF, most activity concentrates between 153.74 and 156.21 MHz and then again from 158.73 to 159.465 MHz. Here you find local government, police, fire, and most such emergency services. If you are near a railroad yard or major railroad tracks, look around 160.0 to 161.9 for signals.

In some larger cities there has been a move to the UHF bands for emergency services. Here, most of the activity is in a spread of 435.025–453.95 MHz and again between 456.025–460.625 MHz.

In the UHF band, mobile units and control units associated with base and repeater units occur in the overall spreads of 456.025–459.95 and 465.025–469.975. The repeater units operate 5 MHz lower (that is, 451.025–454.95 and 460.025–464.975 MHz) than the base units. This means that if you find an active frequency inside one of these spreads, you can look 5 MHz lower (or higher, as the case may be) to find that radio service.

A new technology is now available that allows the use of the 800 MHz band for many services. Some public safety agencies use trunked radio, introduced to business systems in 1979. With as many as twenty channels available, the transmitter automatically selects an unused channel each time it is activated. Several agencies can share such a system without causing interference. This system can also be programmed to provide secure communications for selected units, with unselected units unable to hear the message.

Frequencies in different bands are accessible only at specific intervals. However, the frequencies that you can store into your scanner's memory are in 5 kHz, 12.5 kHz, or 50 kHz steps. Your scanner automatically rounds the entered frequency down to the nearest valid frequency. For example, if you try to enter a frequency of 151.473, your scanner accepts this entry as 151.470.

MAINTENANCE

Your PRO-2006 is an example of superior design and craftsmanship. The following suggestions will help you care for the PRO-2006 so that you can enjoy it for years.

Keep the PRO-2006 dry. If it does get wet, wipe it dry immediately. Liquids can contain minerals that can corrode the electronic circuits.

Use only fresh batteries of the recommended size and type. Always remove old or weak batteries. They can leak chemicals that destroy electronic circuits.

Handle the PRO-2006 gently and carefully. Dropping it can damage circuit boards and cases and can cause the product to work improperly.

Use and store the PRO-2006 only in normal temperature environments. Extreme temperatures can shorten the life of electronic devices, damage batteries, and distort or melt plastic parts.

Keep the PRO-2006 away from dust and dirt, which can cause premature wear of parts.

Wipe the PRO-2006 with a dampened cloth occasionally to keep it looking new. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the PRO-2006.

Modifying or tampering with the PRO-2006's internal components can cause a malfunction and might invalidate the PRO-2006's warranty. If your PRO-2006 is not performing as it should, take it to your local Radio Shack store. Our personnel can assist you and arrange for service if needed.

Band Usage:

30–50 MHz

30.00–30.55 ..... USA,UAR,USN,UCG,UAF
30.58–31.98 ..... IS,IP,IB,LU,PO
32.00–32.99 .. USA,UAR,USN,UCG,UGX,UAF,UIR
33.02–33.98 ..... PS,PH,IS,IB,IP,PF
34.01–34.99 ..... UCG,UER,USA,UAR,UAF, USN,UGX,UIP,UIF
35.02–35.98 ..... IB,IT,RC,RT,IS,PS
36.01–36.99 ..... UIX,UER,USA,UAR,USN,UTR, UCO,IP,UHW,UGF,UGX,UAF
37.02–37.98 ..... PP,PL,IW,PH,PS
38.27–38.99 ..... USA,USN,UGX,UGF,UAR, UAF,UIX,UTV,UVA
39.02–39.98 ..... PP,PL
40.01–41.99 ..... UIA,UAR,UIP,UAF,USA,UVA,UER, USN,UIF,UIR,UTV,UIM,IP,UIX,UEP, UCG,UIL,BIFC,UHW,UTX
42.02–42.94 ..... PP
42.96–43.68 ..... IB,IS,IT,RC,RT,PS
43.70–44.60 ..... LU,LJ
44.62–46.58 ..... PP,PO,PL,PH,PF,PS
46.61–46.99 .. USA,UIL,BIFC,UAF,UAR,UGX,UGF
47.02–49.58 ..... PH,PS,IS,IW,IF,IP
49.61–49.99 ..... UIL,UAR,UGC,UAF,UAR, UGX,UGF,USA

150–173 MHz

150.775–151.985 ..... PM,LA,IF,PH,PO,IS,IB
152.0075–152.84 ..... PM,RC,LX,IF,IB,RT
152.87–153.725 ..... IM,IS,IP,IX,IF,IW
153.74–156.24 ..... PL,PF,IS,IB,PP,PM,PH
156.255–157.45 ..... IP,MC,MS,MG,MP,PM
157.47–158.70 ..... LA,LX,IF,IS,IB,RT,IW,IP,IX,IT,RC
158.73–159.48 ..... PP,PL,PH,PO,IP
159.495–161.565 ..... LR,LJ
161.58–162.00 ..... IP,MC,BA,MP
162.025–173.9875 ..... Misc. Govt. Agencies

406–512 MHz

406.125–419.975 ..... Misc. Govt. Agencies
450.05–450.925 ..... BA
451.00–451.70 ..... IW,IF,IP,IT,IX
451.725–452.175 ..... IS,IF,IP,LX
452.200–453.000 ..... LX,LJ,LR,LA,IY
453.025–453.975 ..... PF,PH,PL,PO,PP
454.025–454.975 ..... RA,RC,RT
460.025–460.625 ..... PF,PS,PP
460.065–462.525 ..... IB,IF,IP,IT,IW,IX
462.550–462.725 ..... GM
462.750–462.925 ..... IB
462.975–463.175 ..... PM
462.300–464.975 ..... IB
470.0125–511.9875 ..... MIXED SERVICES
THESE ALLOCATIONS REPEAT 5 MHz HIGHER.

Unlike the lower bands, frequencies in the 800 MHz band are not allocated by the FCC to specific services such as Police, Fire, Ambulance, and so on. In each area, the channels are licensed on a first come, first served basis. There are two categories for licensing: Public Safety and Industrial. Systems using one to five channels are conventional. Five channel systems might use trunking, but all systems with more than five channels must use trunking.

851.0125–855.9875 ..... Conventional Systems
856.0125–860.9875 ..... Conventional or Trunked
861.0125–865.9875 ..... Trunked Systems
866.0125–868.9875 ..... Public Safety
935.0125–939.9875 ..... Private
940.0125–940.9875 ..... General Purpose

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You might discover some of your regular stations on another frequency that is not listed. It might be what is known as an "image." For example, you suddenly find 453.2750 also being heard on 474.8750. To see if it is an image, do a little math. Take the intermediate frequency of 10.7 MHz and double it. Then, subtract it from the "new" frequency. If the answer is the regular frequency, you have tuned to an image. Occasionally you might get interference on a weak or distant channel from a strong broadcast 21.4MHz below the tuned frequency. This is rare, and the image signal is usually cleared whenever a broadcast on the actual frequency is in progress.

SPECIFICATIONS

FREQUENCY COVERAGE:

25 MHz – 520 MHz
760 MHz – 823.945 MHz
851 MHz – 868.945 MHz
896 MHz – 1300 MHz

RECEPTION FREQUENCY INTERVAL:

5 kHz, 12.5 kHz, 50 kHz

RECEIVING WAVE MODE:

Wide FM (TV sound, FM broadcast)
Narrow FM (Business, communications, ham radio)
AM (Aircraft, CB radio)

CHANNELS OF OPERATION:

Any 400 channels in any band combinations.
(40 channels x 10 Monitor channels)

SENSITIVITY:

WFM: 30 dB S/N at 22.5 kHz deviation

25 MHz – 520 MHz	3 μV
760 MHz – 1100 MHz	3 μV
1100 MHz – 1300 MHz	10 μV

NFM: 20 dB S/N at 3 kHz deviation

25 MHz – 520 MHz	0.5 μV
760 MHz – 1100 MHz	0.5 μV
1100 MHz – 1300 MHz	3 μV

AM: 20 dB S/N at 60% modulation

25 MHz – 520 MHz	2 μV
760 MHz – 1100 MHz	2 μV
1100 MHz – 1300 MHz	5 μV

IF REJECTION:

610 MHz at 70 MHz	60 dB
608MHz at 1000 MHz	60 dB

SELECTIVITY:

NFM and AM

±9 kHz,	–6 dB
±15 kHz,	–50 dB

WFM

±150 kHz,	–6 dB
±300 kHz,	–50 dB

SCANNING RATE:

Fast 26 channels/sec
Slow 13 channels/sec

PRIORITY SAMPLING:

2 seconds

DELAY TIME:

2 seconds

BEFORE YOU CALL FOR HELP

The frequencies stored in the PRO-2006 memory are held by the 9 V battery. You should replace the battery every 6 months. Use only alkaline type, such as Radio Shack's Cat. No. 23-553.

If You Have Problems...

We hope you don't — but here are some suggestions.

Problem	Possible Cause	Remedy
Scanner is totally inoperative.	No power	Check to see that unit is plugged into a working AC outlet, or DC power source.
Scanner is "ON" but will not scan.	Squelch control is not adjusted correctly.	Adjust SQUELCH clockwise.
Scan locks on frequencies having no clear transmission.	"Birdies"	Avoid programming frequencies listed on Page 26, or only listen to them manually.
Keys are inoperative or LCD display is random.	CPU locked-up.	See "Using the Restart Switch" on page 23.

If none of these suggested remedies solves the problem, return your set to your nearbly Radio Shack for assistance.

SQUELCH SENSITIVITY:

NFM and AM

Threshold	25 MHz – 520 MHz	0.5 μV
	760 MHz – 1100 MHz	0.5 μV
	1100 MHz – 1300 MHz	3 μV
Tight S/N	25 MHz – 520 MHz	25 dB
	760MHz – 1100MHz	25 dB
	1100 MHz – 1300 MHz	20 dB

WFM

Threshold	25 MHz – 520 MHz	3 μV
	760 MHz –1100 MHz	3 μV
	1100 MHz – 1300 MHz	15 μV
Tight S/N	25 MHz – 520 MHz	40 dB
	760 MHz – 1100 MHz	40 dB
	1100 MHz – 1300 MHz	40 dB

ANTENNA IMPEDANCE:

50 ohms

AUDIO POWER:

1.3 watts nominal

BUILT-IN SPEAKER:

3" (77 mm) 8 ohms, dynamic type

TAPE OUT (Z= 10 kohm):

600 mV nominal

POWER REQUIREMENTS:

AC 120 Volts 60 Hz 8 watts
DC 13.8 Volts 10 watts

MEMORY BACK-UP BATTERY:

9 Volts

DIMENSIONS:

2 7/8" (76 mm) x 8– /8" (220 mm) x 8 1/4" (205 mm) HWD

WEIGHT:

77.6 oz. (2.2 kg)

Notes:

RADIO SHACK LIMITED WARRANTY

This product is warranted against defects for 1 year from date of purchase from Radio Shack company-owned stores and authorized Radio Shack franchisees and dealers. Within this period, we will repair it without charge for parts and labor. Simply **bring your Radio Shack sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse or accidental damage.

EXCEPT AS PROVIDED HEREIN, RADIO SHACK MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

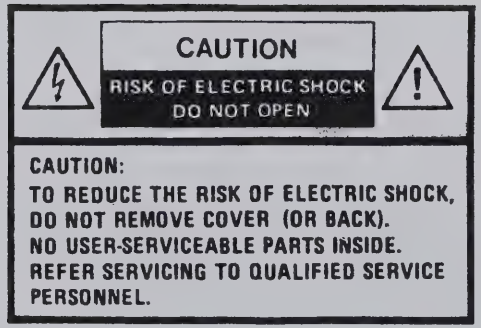
We Service What We Sell

U.S. PATTENT NOS.
3,794,925
3,801,914
3,961,261
3,962,644
4,027,251
4,092,594
4,123,715
4,245,348

RADIO SHACK
A Division of Tandy Corporation
Fort Worth, Texas 76102

1A0

Printed in Japan



WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS RECEIVER TO RAIN OR MOISTURE.

For your important records, please record your scanner's serial number in the box below. The serial number is located on the back panel of your scanner.

The lightning flash with arrowhead within the triangle is intended to alert you to dangerous voltage inside this unit that can cause shock. Do not open enclosure.

The exclamation point within the triangle is intended to alert you to important operating and maintenance instructions in this owner's manual.

Serial Number: _____

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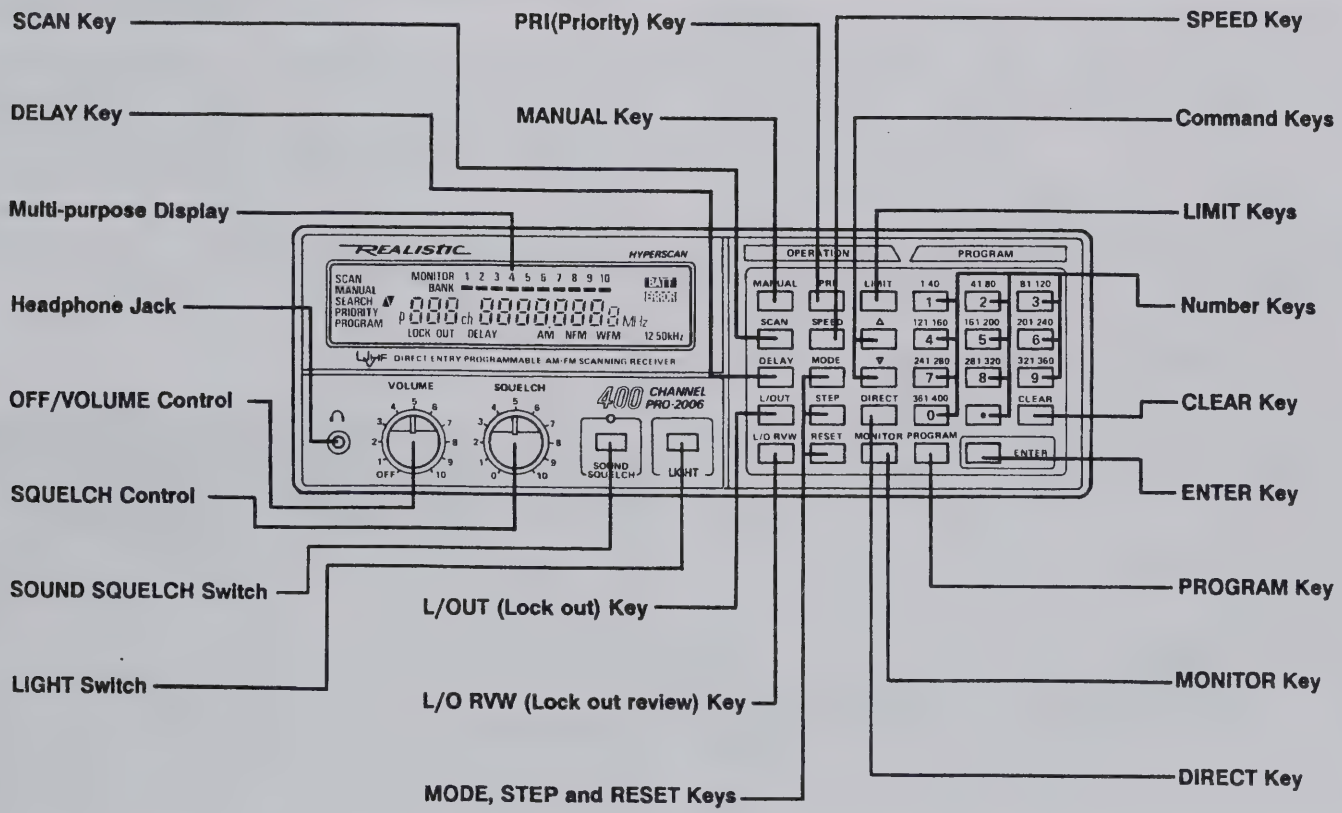
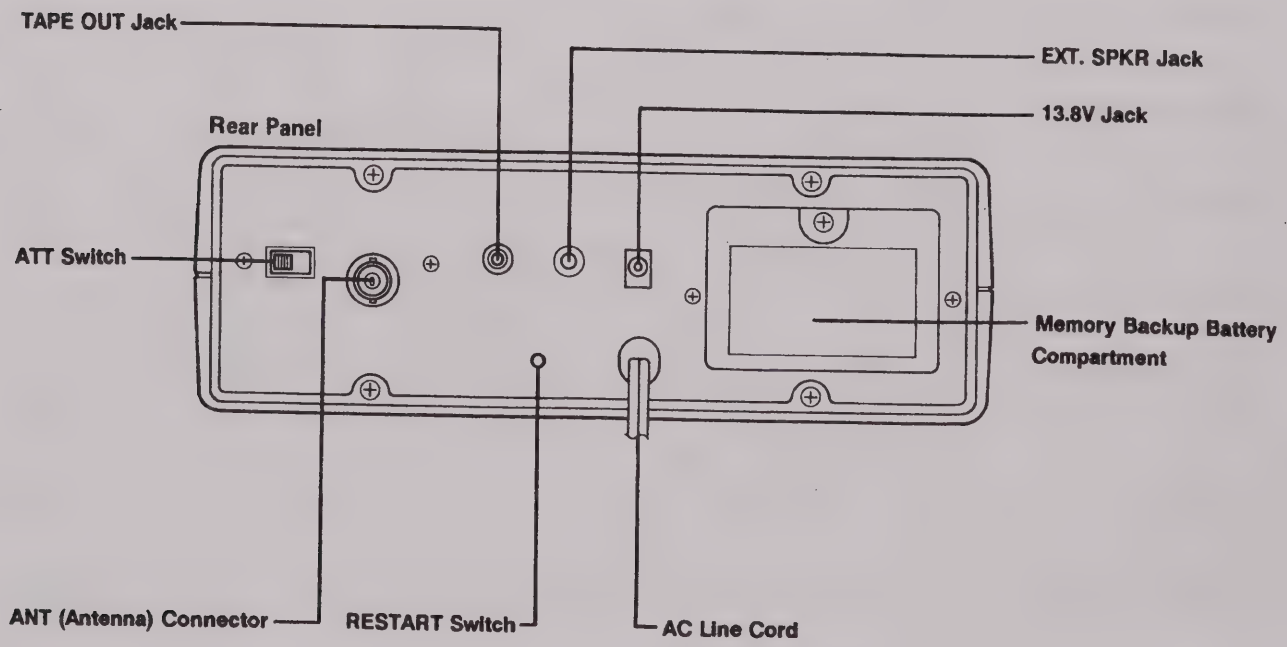
A QUICK LOOK AT YOUR SCANNER




TAPE OUT Jack
EXT. SPKR Jack
13.8V Jack
Rear Panel
ATT Switch
Memory Backup Battery Compartment
ANT (Antenna) Connector
RESTART Switch
AC Line Cord

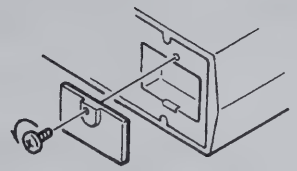
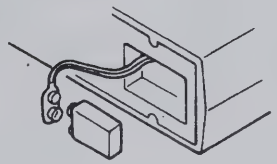
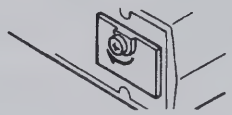
BATTERY INSTALLATION

Your scanner uses a 9-volt battery for memory backup. For longest operation and best performance, we recommend an alkaline battery, such as Radio Shack's Cat. No. 23-553. For best results, replace the battery every six months.

"BATT" flashes in the display and beeps sound when the battery is low or not installed. When this happens, replace or install the battery immediately.

Caution: Your scanner can keep channels stored in its memory for a few minutes even with the AC cord unplugged and the 9-volt battery disconnected. But, to avoid loss of memory information, do not unplug the scanner when replacing the battery.

In addition, never leave a weak or dead battery in your scanner; even "leakproof" batteries can leak damaging chemicals. Battery life is about six months when household AC power or automotive DC power is off for a prolonged period of time.

1	2	3
Remove the battery compartment cover by loosening the screw on the back panel.	Remove the old battery, then snap in a new 9-volt battery.	Install the battery compartment cover.
		

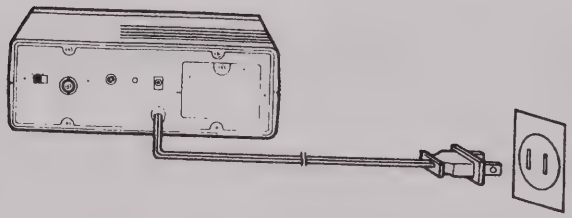
POWER SOURCES

You can power your scanner from the following sources:

- A standard AC outlet
- Your vehicle's battery (using an optional DC power cable)

AC Power Operation

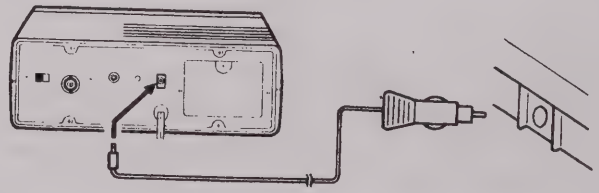
Connect the scanner's AC power cord to a standard AC outlet.



Car Battery Operation

You can power your scanner from your vehicle's cigarette lighter socket, provided the vehicle has a 12 volt, negative ground system. To use DC power, you need Radio Shack's DC power cable (Cat. No.270-1534B).

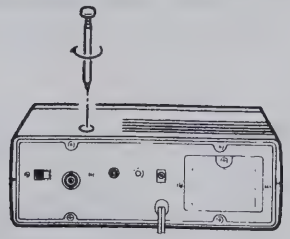
Connect the DC power cable's plug to the 13.8 volt jack on the rear panel. Then, plug the DC power cable into the cigarette lighter socket of your vehicle.



Note: Mobile use of scanners might be unlawful or require a permit in some areas. Check with your local authorities.

CONNECTING THE ANTENNA

We have provided a telescoping antenna with your scanner. This antenna is adequate for strong local signals. To install it, simply screw it into the hole on the top of the scanner.



Antenna length controls the sensitivity: adjust the length of the telescoping antenna for best reception. Refer to the table below.

25 MHz–300 MHz	extend fully
300 MHz–520 MHz	extend 3 segments
760 MHz–1300 MHz	collapse fully (one segment only)

Your scanner has better reception when you attach a multiband outdoor antenna to it. Radio Shack stores sell a complete line of outdoor scanner antennas.

To install an outdoor antenna:

1. Select a location for the outdoor antenna that is as high as possible.
2. Following the instructions that came with the antenna and its mounting hardware, mount the antenna.
3. Connect the antenna to the scanner using coaxial cable. Always use 50 ohm coaxial cable. For lengths over 50 feet, use RG8 low-loss, dielectric coaxial cable.

WARNING WARNING WARNING

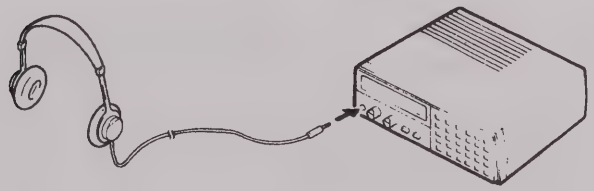
When installing or removing outdoor antennas, use extreme caution. If the antenna starts to fall, let it go! It could contact overhead power lines. IF THE ANTENNA TOUCHES THE POWER LINE, CONTACT WITH THE ANTENNA, MAST, CABLE, OR GUY WIRES CAN CAUSE ELECTROCUTION AND DEATH! Call the power company to remove the antenna. Do not attempt to do so yourself.

USING THE FOLDING FEET

Your scanner's front feet are folding type. Use them according to the location of the scanner.

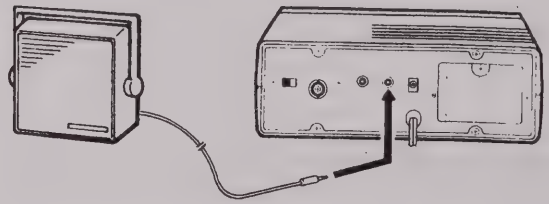
CONNECTING HEADPHONES

For private listening or in a noisy environment, plug headphones into the headphone jack on front of your scanner. Plugging in headphones automatically disconnects the internal speaker. We recommend Radio Shack's mono headset (Cat. No. 20-210).



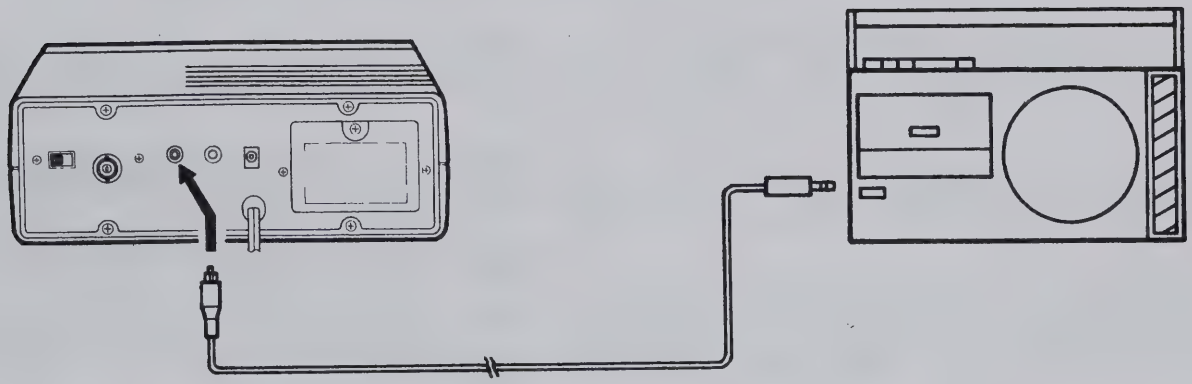
CONNECTING AN EXTENSION SPEAKER

In a noisy area, an extension speaker (such as Radio Shack's Cat. No. 21-549), positioned in the right place, might provide more comfortable listening. Plug the speaker cable's 1/8-inch mini-plug into your scanner's EXT SPKR jack.

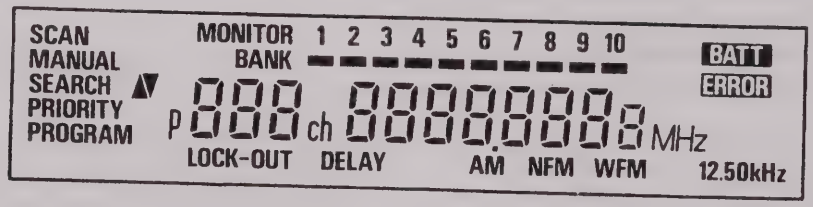


CONNECTING AN EXTERNAL TAPE RECORDER

You can record scanner transmissions with a tape recorder through the TAPE OUT jack. Consult your local Radio Shack store for the appropriate connecting cable.



A LOOK AT THE DISPLAY



The display has several abbreviated indicators that show your scanner's current operating mode. A quick look at the display will help you understand how your scanner operates.

The above illustration shows your scanner's display with all the indicators on. The following is a brief explanation of the indicators.

BANK—bars to the right of this indicator show which memory banks are currently turned on for the scan mode. See "Understanding Channel Storage Banks and Search Banks."

SCAN—comes on when the scanner is in the scan mode.

DELAY—appears when the scanner is on a channel that you have programmed with the delay feature. See "Using the Delay Feature."

LOCK-OUT—appears when the channel you are listening to is locked out of the scan mode. See "Locking Out Channels."

MANUAL—comes on when the scanner is in the manual channel selection mode.

ch—digits preceding this indicator show which channel the scanner is currently tuned to.

MHz—digits preceding this indicator show the frequency the scanner is currently tuned to.

MONITOR—appears when the scanner is in the monitor mode. See "Moving a Frequency from a Monitor Memory to a Channel."

PRIORITY—appears when you have turned on the priority channel feature.

PROGRAM—appears when the scanner is ready for programming.

BATT—flashes when the batteries need to be installed or replaced.

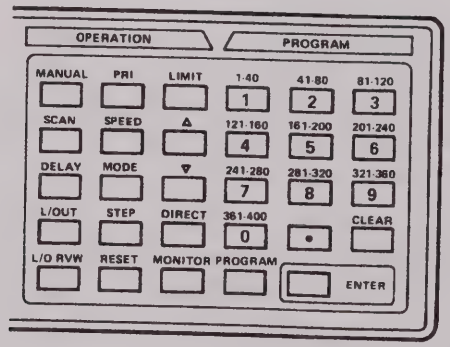
P—appears when you are listening to the priority channel.

SEARCH—appears during a limit search or a direct frequency search. ▲ and ▼ also appear in the display to show the direction of the search.

AM, NFM, WFM—shows which band mode is currently selected. See "Understanding Band Modes and Frequency Steps."

5, 12.5, 50—shows which frequency step is currently selected. See "Understanding Band Modes and Frequency Steps."

A LOOK AT THE KEYBOARD



The keys on your scanner might seem cryptic at first, but a quick glance at this page should help you understand each key's function.

Number Keys—each have a single digit, and a range of numbers printed above it. The single digit is the number entered when you are entering a channel number or a frequency. The range of numbers (1-40, for example) shows the channels that make up a memory bank. See "Understanding Channel Storage Banks and Search Banks."

SCAN—causes your scanner to scan through the programmed channels.

MANUAL—stops scanning and allows you to directly enter a channel number.

CLEAR—deletes an incorrect entry.

L/OUT—turns on the lockout function. See "Locking Out Channels."

L/O RVW—recalls locked out channels sequentially.

DELAY—turns the delay feature on or off for the current channel.

SPEED—changes the scanning and search speed.

MONITOR—is used to access the monitor memories. See "Moving a Frequency from Monitor Memory to a Channel."

PRI—selects the priority channel.

PROGRAM—is used when programming frequencies into channels.

ENTER—used to enter the frequency when programming channels.

LIMIT, ▲, and ▼—are used during frequency searching. See "Searching for Active Frequencies."

DIRECT—starts the direct search.

MODE—changes the band mode in the following order: AM–NFM–WFM.

STEP—used to change frequency steps in the following order: 5 kHz–12.5 kHz–50 kHz.

RESET—initializes band mode and frequency step.

UNDERSTANDING CHANNEL STORAGE BANKS AND SEARCH BANKS

Your scanner can store up to 410 frequencies. You store each frequency in either a permanent memory, called a *channel*, or a temporary memory, called a *monitor*. The scanner has 400 channels and ten monitor memories.

To make it easier to identify and select the channels you want to listen to, channels are divided into ten groups of 40 channels. Each group of channels is called a bank. Perhaps the best way to explain the use of memory banks is through a practical example.

Suppose you want to monitor four different agencies: police, fire, ambulance, and aircraft. As a rule, each agency has several different frequencies they use for different purposes. The police might have four frequencies, one for each side of town. To make it easier to quickly determine which agency you are listening to, you could program the police frequencies starting with Channel 1 (Bank 1). Then, start the fire department on Channel 41 (Bank 2), ambulance service on Channel 81 (Bank 3), and aircraft frequencies on Channel 121 (Bank 4).

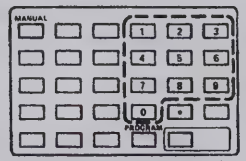
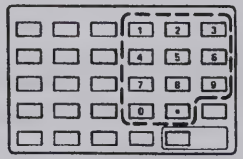
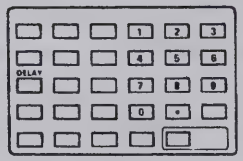
Now, when you want to listen to only fire calls, it is simple to turn off Banks 1 and 3 through 10 so that only Bank 2 is scanned. You could also use this feature to group the channels by city or by county. Simply press the number corresponding to the bank you want to turn on or off. The bar below the number in the display shows that bank is on.

Your scanner also has ten temporary monitor memories. You use these memories to store frequencies temporarily, while you decide whether to save them in one of the permanent channels. This is handy for quickly storing an active frequency when you are searching through an entire band. See "Searching for Active Frequencies."

When you are in the monitor mode, the ten numbers at the top of the display represent the ten monitor memories. The flashing number shows the current monitor memory.

In addition, your scanner has ten search banks. You can use these banks to store your selected limit search ranges. See "Searching for Active Frequencies."

PROGRAMMING THE PRO-2006 SCANNER

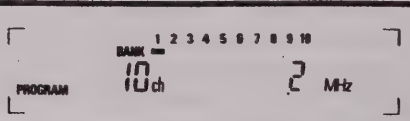
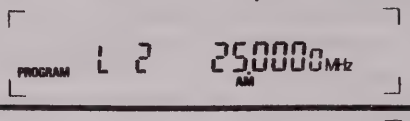
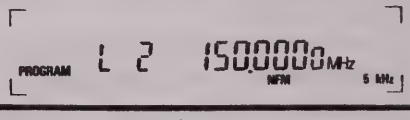
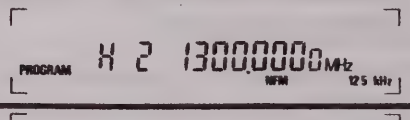
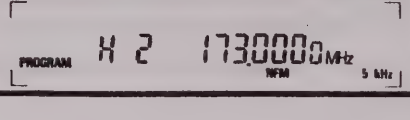
1	Select a channel to program by pressing [MANUAL], and entering the channel number you want to program. Then, press [PROGRAM]. "PROGRAM" appears in the display to indicate that your scanner is in the programming mode.	
2	Enter a frequency. A good reference for active frequencies is Radio Shack *Police Call Directory Including Fire and Emergency Services*. We update this directory yearly, so be sure to get a current one. Also refer to "Reception Notes" and "Searching for Active Frequencies" in this manual.	
3	Press [ENTER]. This stores the frequency. If you made a mistake in Step 2, "Error" appears in the display and three beeps sound. Press [CLEAR] and proceed again from Step 2.	
4	Press [DELAY]. If you want your scanner to pause after each transmission before scanning to the next channel, press [DELAY]. "DELAY" appears in the display. If you do not want your scanner to pause, press [DELAY] again. "DELAY" disappears from the display.	
5	Repeat Steps 1–4 to program more channels. **NOTE:** If you want to program the next channel in sequence, just press [PROGRAM] and proceed to Step 2.	

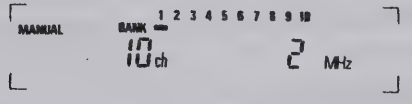
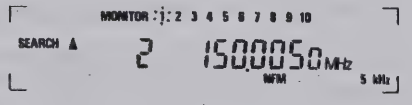
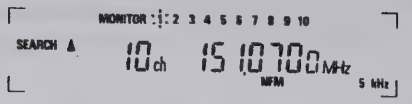
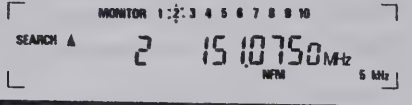
SEARCHING FOR ACTIVE FREQUENCIES

Use these procedures to search for a transmission. This is helpful if you do not have a reference to frequencies in your area. Also, see "Guide to the Action Bands" in this manual.

Limit Search

The limit search procedure allows you to search within a range of frequencies. You can store up to ten limit search ranges in the search banks.

1	Press [PROGRAM], and the search bank number in which you wish to store the limit search range. Press [0] for bank number 10.	
2	Press [LIMIT]. "L" and the search bank number appears in the display.	
3	Enter the lower limit of the frequency range. Then, press [ENTER].	
4	Press [LIMIT]. "L" changes to "H" in the display.	
5	Enter the upper limit of the frequency range. Then, press [ENTER].	

6	Repeat steps 1–5 to store the limit-search range into the search banks. You can store up to 10 limit-search ranges.	
7	To recall a limit-search range, press the appropriate bank number.	
8	Press [▼] to search from the upper limit down to the lower limit. Or press [▲] to search upward starting from the lower limit.	
9	When the scanner stops on a transmission, press [MONITOR] to store the frequency in the current monitor memory. The memory number flashing on the display indicates the current monitor memory.	
10	To continue the search, press [▼] or [▲].	

Notes:

- Press [SPEED] to speed up or slow down the search.
- Press [DELAY] to make the scanner pause 2 seconds after a transmission, before proceeding to the next frequency.

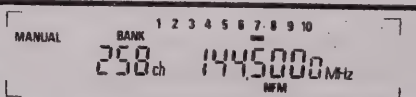
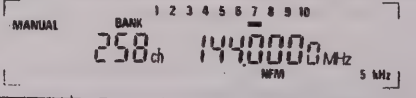
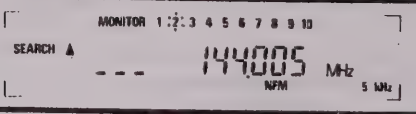
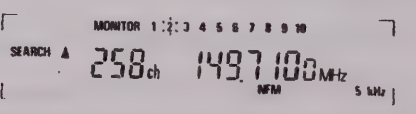
Limit-Search Memory

When you change your scanner's mode from limit search to manual, program, scan, direct search, and so on, your scanner retains the last frequency before you change the mode. Your scanner resumes the search from that frequency when you change the mode to limit search again.

Note: You can change the upper or lower limit frequency without affecting the memorized frequency if the frequency is within the new limit range. If the frequency is out of the new limit range, the search starts from the new upper or lower limit frequency.

Direct Search

When you are in program or manual mode, you can search up or down from the current frequency.

1	Select a currently programmed channel by pressing [MANUAL], and the channel number. Then, press either [MANUAL] or [PROGRAM].	
2	Press [DIRECT]. The step frequency appears in the display.	
3	Press [▲] to search through higher frequencies or [▼] to search through lower frequencies.	
4	When the search stops on a transmission, you can store that frequency into a monitor memory by pressing [MONITOR]. The memory number flashing on the display indicates the current memory number. To continue the search, press [▼] or [▲].	

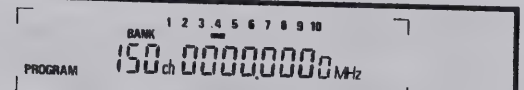
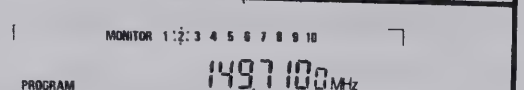
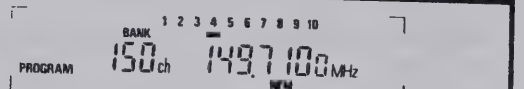
Notes:

- When you press [DIRECT] during limit, your scanner enters direct search mode.
- When you press a numeric key during a direct search, your scanner changes to limit search mode. The key you press corresponds with the limit-search bank number.

MOVING A FREQUENCY FROM A MONITOR MEMORY TO A CHANNEL

As you store frequencies in monitor memories, the memory number flashing on the display shows the current monitor memory. You can listen to monitor memories by pressing [MANUAL], [MONITOR], then the number of the monitor memory you want to listen to.

If there is a frequency you wish to transfer to a channel, follow this procedure to move it from the monitor memory:

1	Press [MANUAL], and the channel number in which you want to store the frequency. Then, press [PROGRAM].	
2	Press [MONITOR], and the memory number you want to move.	
3	Press [ENTER]. The scanner stores the frequency in the channel you entered.	

If you want to return to a limit search after this procedure, press [LIMIT], and the search bank number. Then, press either [▲] or [▼] to continue searching.

UNDERSTANDING BAND MODES AND FREQUENCY STEPS

We designed your scanner to adjust itself for the band modes and frequency steps for each frequency range. Default settings are as shown below.

FREQUENCY VS. MODE AND STEP

FREQUENCY (MHz)	MODE	STEP (kHz)
25.000 – 29.995	AM	5
30.000 – 87.495	NFM	5
87.500 – 107.995	WFM	50
108.000 – 135.995	AM	12.5
136.000 – 224.995	NFM	5
225.000 – 520.000	NFM	12.5
760.000 – 1300.000	NFM	12.5

WFM: Wideband FM for normal FM broadcasts or TV sound.

NFM: Narrowband FM for action radio bands, police, fire, ambulance, ham radio, and so on.

AM: For aircraft band, CB, and so on.

Normally, the preset mode/step works within each band as shown above. However, for some of the ham radio, military aircraft (225–400 MHz), and TV audio (WFM) bands, you must change the mode or step manually. To change the band mode, press [MODE] when your scanner is in manual mode. To change the frequency step, press [STEP] in search mode. Note that when you change the preset modes/steps, the corresponding indicator flashes to show you that you changed the default setting.

When you want to return to the default setting, press [RESET]. The display stops flashing.

Keep in mind that improperly setting the modes or steps can cause poor reception. When you listen to an FM broadcast or TV sound in the NFM mode, the sound is very distorted. If you monitor police band in WFM mode, the sound is masked by noise. Or if you use 5 kHz or 12.5 kHz steps to search for FM broadcasts or TV sound, the search might stop on the sideband of the frequency. In that case, press [▲] or [▼] to get the center frequency. If you use 50 kHz steps for NFM band, you might miss the frequencies between the 50 kHz steps.

USING THE RESTART SWITCH

The scanner's display might lock up the first time you plug in and turn on your scanner, or if the battery is left out for an extended period of time. If the display locks, use a pointed object, like a paper clip, to press and release the restart switch while power is on.

To clear all the memories, be sure the scanner is turned on and:

1. Press and hold [CLEAR].
2. Using a pointed object, press and release the restart switch.
3. After confirming that the display goes blank, release [CLEAR].

SETTING THE VOLUME AND SQUELCH

Turn VOLUME clockwise and SQUELCH counterclockwise until you hear a hissing sound. Then, slowly turn SQUELCH clockwise until the noise stops. Leave VOLUME set to a comfortable listening level.

If the scanner picks up unwanted weak transmissions, turn SQUELCH clockwise to decrease the scanner's sensitivity to these signals.

USING THE SOUND SQUELCH SWITCH

If the scanner stops at a transmission during scan, search, or priority modes, the [SOUND SQUELCH] switch lets the scanner start scanning again if the transmission contains no sound (carrier only without modulated signals).

If your scanner stops at a frequency that has no sound, press [SOUND SQUELCH]. The indicator lights. If the scanner detects no sound within 0.5 seconds, it goes to the next transmission.

When the scanner receives a frequency that contains sound, it halts at the frequency. If the sound ceases, the scanner stays on the frequency for 5 seconds, and resumes scanning. If the carrier stops, the scanner begins to scan immediately if the delay function is off, or after 2 seconds if the delay function is on.

To cancel sound squelch, press [SOUND SQUELCH] again. The indicator goes off.

Note: If a frequency contains a transmission with low modulation, the sound squelch circuit might not work properly.

SCANNING THE CHANNELS

To begin scanning channels, just press [SCAN]. Your scanner scans through all the channels that you have not locked out of the banks that are turned on. You must set SQUELCH so that you do not hear the hissing sound between transmissions. Be sure to read the following sections to get the full benefit from the special features of your scanner.

USING THE DELAY FEATURE

Many agencies use two-way radio systems that might have a period of several seconds between a query and a reply. To keep from missing a reply, program a delay on the channels you identify as operating this way. To program a delay, manually select the channel, and press [DELAY]. "DELAY" appears in the display. Now, when you are scanning through channels, your scanner pauses for two seconds after the completion of each transmission on that channel before resuming scanning.

Some radio systems, especially those above 800 MHz, use a special "trunked" system. In these systems, the transmitter selects an available frequency each time the operator keys the radio. Therefore, it is possible for the query to be on one frequency and the reply on another. To ensure the best possibility of hearing the full reply, you want the scanner to begin scanning immediately when the first transmission ends. In this case, select the channel manually and ensure that "DELAY" is not in the display. If "DELAY" is indicated, press [DELAY] to turn off this feature for that channel.

SETTING THE SCANNING SPEED

Your scanner has two different scanning speeds – 13 channels per second and 26 channels per second. To switch between the two scanning speeds, press [SPEED] during scanning.

LOCKING OUT CHANNELS

You can increase the effective scanning speed by locking out channels that you have not programmed. Manually select the channel, and then press [L/OUT], so that "LOCKOUT" appears in the display. This is also handy for locking out channels that have a continuous transmission, such as a weather channel. You can still manually select locked-out channels for listening.

To disable the lock-out function, manually select the channel and press [L/OUT]. Or, press [L/O RVW] in manual or program mode to call out locked-out channels one by one. Then, press [L/OUT] again.

Note: You can lock out as many channels as you like. But there must be at least one channel that you have not locked out in each bank.

TURNING BANKS ON AND OFF

As explained in "Understanding Channel Storage Banks and Search Banks" your scanner splits the 400 channels into ten banks of forty channels each. The small bars under the numbers at the top of the display are the bank indicators. You can turn each bank on and off, so that all the channels in a bank are either scanned or locked out. In scan mode, press the number key for the bank you want to turn on or off. If the bank indicator is on, you have turned on the bank and the scanner scans all the channels within that bank that you have not locked out. If the indicator is off, the scanner does not scan any of the channels within that bank. You can still manually select any channel in a bank, even if you have turned off the bank. You cannot turn off all banks – one must be turned on.

USING THE PRIORITY FEATURE

You can scan through all your programmed channels, and still not miss an important or interesting call on a specific channel. Simply program your desired channel as the priority channel, and turn on the priority feature by pressing [PRI] during scanning. The scanner now checks the priority channel every two seconds, and stays on the channel if there is activity.

To program a priority channel, simply press [PROGRAM], and the desired channel number. Then, press [PRI]. "P" appears in the display whenever the scanner is set to the priority channel. You can only program one channel as the priority channel. If you program a new channel as the priority channel, the previous channel you chose is automatically cleared.

Note: Channel 1 is automatically designated as the priority channel the first time you turn on your scanner.

MANUALLY SELECTING A CHANNEL

You can continuously monitor a single channel without scanning. This is useful if you hear an emergency broadcast on a channel and do not want to miss any of the details – even though there might be periods of silence – or if you want to monitor a channel that you have locked out. To select a channel to monitor, just press [MANUAL], and enter the channel number. Then, press [MANUAL] again. Or, if your scanner is scanning and has stopped at the desired channel, just press [MANUAL] once. Pressing [MANUAL] additional times causes your scanner to step through the channels one at a time.

USING THE LIGHT SWITCH

Press [LIGHT] to turn on or off the display's backlight. For longest backlight life, be sure to turn off the backlight when you do not need it.

BIRDIES

Birdies are the products of internally generated signals that make some frequencies difficult or impossible to receive. If you program one of these frequencies, you hear only noise on that frequency.

If the interference is not severe, you might be able to turn SQUELCH clockwise to cut out the birdie. The most common birdies to watch out for are listed below.

Birdie Frequencies

(MHz)	(MHz)	(MHz)	(MHz)	(MHZ)	(MHz)
30.135	130.9375	342.000	851.875	1098.250	1245.850
45.200	144.135	342.800	854.375	1104.250	1248.650
48.045	155.125	366.000	856.875	1107.000	1260.000
51.230	185.450	366.750	867.9375	1109.750	1262.750
57.260	203.500	464.250	900.0625	1112.500	1265.500
59.500	208.000	465.250	902.5625	1125.000	1272.350
60.260	220.750	488.375	905.0625	1163.6875	1275.150
63.275	244.250	489.375	916.125	1166.4375	1277.950
69.300	249.750	500.4375	918.625	1169.1875	1280.750
72.315	250.500	501.4375	921.125	1203.3125	1288.400
75.330	278.4375	767.400	948.250	1206.0625	1291.200
78.330	279.1875	769.800	950.750	1208.8125	1294.000
79.800	298.0625	785.250	953.250	1224.200	1296.800
84.375	298.8125	803.550	1015.000	1227.000	
87.395	309.800	805.950	1017.500	1229.800	
122.375	310.600	815.600	1026.000	1232.600	
122.875	327.500	818.000	1052.750	1240.250	
130.4375	334.750	822.250	1088.875	1243.050	

CROSS MODULATION

When using an external antenna, a strong frequency close to the reception frequency might cause cross modulation (like cross talk). Set the ATT switch on the back panel to –10 dB to minimize cross modulation.

RECEPTION NOTES

Reception on the frequencies covered by your scanner is mainly "line of sight." That means you usually cannot hear stations at your listening location that are located beyond the horizon.

During summer months, you might be able to hear stations in the 30–50 MHz range located several hundred or even thousands of miles away. This is due to summer atmospheric conditions. This type or reception is unpredictable, but often very interesting!

One very useful service is the National Weather Service's continuous weather broadcasts. These broadcasts contain weather forecasts and data for the area around the station, plus bulletins on any threatening weather conditions. These stations use three frequencies: 162.40, 162.475, and 162.55 MHz. In most areas of the country, you can receive one of these frequencies.

GUIDE TO THE ACTION BANDS

With the right frequencies programmed into your scanner, you can monitor exciting events. With a little investigation, you can find active frequencies in your community. We can give you some general pointers, and you can take it from there. Please use caution and common sense when you hear an emergency call. Never go to the scene of an emergency – it could be the most dangerous thing you could ever do.

Find out if there is a local club that monitors your community's frequencies. Perhaps, a local electronics repair shop that works on equipment similar to your scanner can give you channel frequencies used by local radio services. A volunteer police or fire employee can also be a good source of this information.

As a general rule on VHF, most activity concentrates between 153.74 and 156.21 MHz and then again from 158.73 to 159.465 MHz. Here you find local government, police, fire, and most such emergency services. If you are near a railroad yard or major railroad tracks, look around 160.0 to 161.9 for signals.

In some larger cities there has been a move to the UHF bands for emergency services. Here, most of the activity is in a spread of 435.025–453.95 MHz and again between 456.025–460.625 MHz.

In the UHF band, mobile units and control units associated with base and repeater units occur in the overall spreads of 456.025–459.95 and 465.025–469.975. The repeater units operate 5 MHz lower (that is, 451.025–454.95 and 460.025–464.975 MHz) than the base units. This means that if you find an active frequency inside one of these spreads, you can look 5 MHz lower (or higher, as the case may be) to find that radio service.

A new technology is now available that allows the use of the 800 MHz band for many services. Some public safety agencies use trunked radio, introduced to business systems in 1979. With as many as twenty channels available, the transmitter automatically selects an unused channel each time it is activated. Several agencies can share such a system without causing interference. This system can also be programmed to provide secure communications for selected units, with unselected units unable to hear the message.

Frequencies in different bands are accessible only at specific intervals. However, the frequencies that you can store into your scanner's memory are in 5 kHz, 12.5 kHz, or 50 kHz steps. Your scanner automatically rounds the entered frequency down to the nearest valid frequency. For example, if you try to enter a frequency of 151.473, your scanner accepts this entry as 151.470.

TYPICAL BAND USAGE

The following is a brief listing of the typical services using the bands your PRO-2006 can receive. This listing can help you decide which ranges you would like to scan.

These frequencies are subject to change, and might vary some from area to area. For a more complete listing, refer to the "*Police Call Radio Guide Including Fire & Emergency Services*." at your local Radio Shack.

Abbreviations:

BA.....Remote Broadcast (Radio & TV)
CA.....General Mobile (Radio)
CAP.....Civil Air Patrol
IB.....Business
IF.....Forest Products
IM.....Motion Picture Industry
IP.....Petroleum Industry
IS.....Special Industrial (Construction,farming,etc.)
IT.....Telephone Maintenance
IW.....Power and Water Utilities
IX.....Manufacturers
IY.....Relay Press (newspaper reporters)
LA.....Automotive Emergency (tow trucks)
LJ.....Motor Carrier, Trucks
LR.....Railroad
LU.....Motor Carrier, Buses
LX.....Taxi
MC.....Maritime Limited Coast (private stations)
MG.....Maritime Government (Coast Guard)
MP.....Maritime Public Coast (marine telephone)
MS.....Maritime Shipboard
PF.....Fire
PH.....Highway Maintenance
PL.....Local Government
PM.....Medical Services
PO.....Forestry Conservation
PP.....Police
PS.....Special Emergency
RA.....Mobile Telephone (aircraft)
RC.....Mobile Telephone (radio common carrier)
RT.....Mobile Telephone (landline companies)
BIFC.....Boise Interagency Fire Cache

Government Agencies:

UAF.....Air Force
UAR.....Army
UBW.....International Boundary & Water Commission
UCE.....Environmental Research Laboratories
UCF.....Maritime Fisheries Service
UCG.....Coast Guard
UCM.....Maritime Administration
UCO.....Ocean Survey
UCP.....National Capitol Police
UCW.....National Weather Service
UCX.....Department of Commerce
UEP.....Environmental Protection Agency
UER.....Department of Energy
UFA.....Federal Aviation Administration
UFC.....Federal Communications Commision
UGC.....Soil Conservation Service
UGF.....Forest Service
UGS.....General Services Administration
UGX.....Department of Agriculture
UHW.....Dept. of Health and Human Services
UIB.....Bonneville Power Administration
UIF.....Bureau of Sport Fisheries and Wildlife
UIG.....Geological Survey
UII.....Bureau of Indian Affairs
UIL.....Bureau of Land Management
UIM.....Bureau of Mines
UIP.....National Park Service
UIR.....Bureau of Reclamation
UIS.....Southwestern Power Administration
UIX.....Department of the Interior
UNO.....United Nations
UNS.....NASA
UPO.....Postal Service
USA.....Federal Govt. Misc.
USD.....State Department
USN.....Navy
UTC.....Bureau of Customs
UTM.....Bureau of the Mint
UTR.....Department of Transportation
UTV.....Tennessee Valley Authority
UTX.....Treasury Department
UVA.....Veterans Administration
UXX.....Classified

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Band Usage:

30–50 MHz

30.00–30.55 ..... USA,UAR,USN,UCG,UAF
30.58–31.98 ..... IS,IP,IB,LU,PO
32.00–32.99 .. USA,UAR,USN,UCG,UGX,UAF,UIR
33.02–33.98 ..... PS,PH,IS,IB,IP,PF
34.01–34.99 ..... UCG,UER,USA,UAR,UAF, USN,UGX,UIP,UIF
35.02–35.98 ..... IB,IT,RC,RT,IS,PS
36.01–36.99 ..... UIX,UER,USA,UAR,USN,UTR, UCO,IP,UHW,UGF,UGX,UAF
37.02–37.98 ..... PP,PL,IW,PH,PS
38.27–38.99 ..... USA,USN,UGX,UGF,UAR, UAF,UIX,UTV,UVA
39.02–39.98 ..... PP,PL
40.01–41.99 ..... UIA,UAR,UIP,UAF,USA,UVA,UER, USN,UIF,UIR,UTV,UIM,IP,UIX,UEP, UCG,UIL,BIFC,UHW,UTX
42.02–42.94 ..... PP
42.96–43.68 ..... IB,IS,IT,RC,RT,PS
43.70–44.60 ..... LU,LJ
44.62–46.58 ..... PP,PO,PL,PH,PF,PS
46.61–46.99 .. USA,UIL,BIFC,UAF,UAR,UGX,UGF
47.02–49.58 ..... PH,PS,IS,IW,IF,IP
49.61–49.99 ..... UIL,UAR,UGC,UAF,UAR, UGX,UGF,USA

150–173 MHz

150.775–151.985 ..... PM,LA,IF,PH,PO,IS,IB
152.0075–152.84 ..... PM,RC,LX,IF,IB,RT
152.87–153.725 ..... IM,IS,IP,IX,IF,IW
153.74–156.24 ..... PL,PF,IS,IB,PP,PM,PH
156.255–157.45 ..... IP,MC,MS,MG,MP,PM
157.47–158.70 ..... LA,LX,IF,IS,IB,RT,IW,IP,IX,IT,RC
158.73–159.48 ..... PP,PL,PH,PO,IP
159.495–161.565 ..... LR,LJ
161.58–162.00 ..... IP,MC,BA,MP
162.025–173.9875 ..... Misc. Govt. Agencies

406–512 MHz

406.125–419.975 ..... Misc. Govt. Agencies
450.05–450.925 ..... BA
451.00–451.70 ..... IW,IF,IP,IT,IX
451.725–452.175 ..... IS,IF,IP,LX
452.200–453.000 ..... LX,LJ,LR,LA,IY
453.025–453.975 ..... PF,PH,PL,PO,PP
454.025–454.975 ..... RA,RC,RT
460.025–460.625 ..... PF,PS,PP
460.065–462.525 ..... IB,IF,IP,IT,IW,IX
462.550–462.725 ..... GM
462.750–462.925 ..... IB
462.975–463.175 ..... PM
462.300–464.975 ..... IB
470.0125–511.9875 ..... MIXED SERVICES
THESE ALLOCATIONS REPEAT 5 MHz HIGHER.

Unlike the lower bands, frequencies in the 800 MHz band are not allocated by the FCC to specific services such as Police, Fire, Ambulance, and so on. In each area, the channels are licensed on a first come, first served basis. There are two categories for licensing: Public Safety and Industrial. Systems using one to five channels are conventional. Five channel systems might use trunking, but all systems with more than five channels must use trunking.

851.0125–855.9875 ..... Conventional Systems
856.0125–860.9875 ..... Conventional or Trunked
861.0125–865.9875 ..... Trunked Systems
866.0125–868.9875 ..... Public Safety
935.0125–939.9875 ..... Private
940.0125–940.9875 ..... General Purpose

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You might discover some of your regular stations on another frequency that is not listed. It might be what is known as an "image." For example, you suddenly find 453.2750 also being heard on 474.8750. To see if it is an image, do a little math. Take the intermediate frequency of 10.7 MHz and double it. Then, subtract it from the "new" frequency. If the answer is the regular frequency, you have tuned to an image. Occasionally you might get interference on a weak or distant channel from a strong broadcast 21.4MHz below the tuned frequency. This is rare, and the image signal is usually cleared whenever a broadcast on the actual frequency is in progress.

MAINTENANCE

Your PRO-2006 is an example of superior design and craftsmanship. The following suggestions will help you care for the PRO-2006 so that you can enjoy it for years.

Keep the PRO-2006 dry. If it does get wet, wipe it dry immediately. Liquids can contain minerals that can corrode the electronic circuits.

Use and store the PRO-2006 only in normal temperature environments. Extreme temperatures can shorten the life of electronic devices, damage batteries, and distort or melt plastic parts.

Use only fresh batteries of the recommended size and type. Always remove old or weak batteries. They can leak chemicals that destroy electronic circuits.

Keep the PRO-2006 away from dust and dirt, which can cause premature wear of parts.

Handle the PRO-2006 gently and carefully. Dropping it can damage circuit boards and cases and can cause the product to work improperly.

Wipe the PRO-2006 with a dampened cloth occasionally to keep it looking new. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the PRO-2006.

Modifying or tampering with the PRO-2006's internal components can cause a malfunction and might invalidate the PRO-2006's warranty. If your PRO-2006 is not performing as it should, take it to your local Radio Shack store. Our personnel can assist you and arrange for service if needed.

BEFORE YOU CALL FOR HELP

The frequencies stored in the PRO-2006 memory are held by the 9 V battery. You should replace the battery every 6 months. Use only alkaline type, such as Radio Shack's Cat. No. 23-553.

If You Have Problems...

We hope you don't – but here are some suggestions.

Problem	Possible Cause	Remedy
Scanner is totally inoperative.	No power	Check to see that unit is plugged into a working AC outlet, or DC power source.
Scanner is "ON" but will not scan.	Squelch control is not adjusted correctly.	Adjust SQUELCH clockwise.
Scan locks on frequencies having no clear transmission.	"Birdies"	Avoid programming frequencies listed on Page 26, or only listen to them manually.
Keys are inoperative or LCD display is random.	CPU locked-up.	See "Using the Restart Switch" on page 23.

If none of these suggested remedies solves the problem, return your set to your nearbly Radio Shack for assistance.

SPECIFICATIONS

FREQUENCY COVERAGE:

25 MHz – 520 MHz
760 MHz – 823.945 MHz
851 MHz – 868.945 MHz
896 MHz – 1300 MHz

RECEPTION FREQUENCY INTERVAL:

5 kHz, 12.5 kHz, 50 kHz

RECEIVING WAVE MODE:

Wide FM (TV sound, FM broadcast)
Narrow FM (Business, communications, ham radio)
AM (Aircraft, CB radio)

CHANNELS OF OPERATION:

Any 400 channels in any band combinations.
(40 channels x 10 Monitor channels)

SENSITIVITY:

WFM: 30 dB S/N at 22.5 kHz deviation

25 MHz – 520 MHz	3 μV
760 MHz – 1100 MHz	3 μV
1100 MHz – 1300 MHz	10 μV

NFM: 20 dB S/N at 3 kHz deviation

25 MHz – 520 MHz	0.5 μV
760 MHz – 1100 MHz	0.5 μV
1100 MHz – 1300 MHz	3 μV

AM: 20 dB S/N at 60% modulation

25 MHz – 520 MHz	2 μV
760 MHz – 1100 MHz	2 μV
1100 MHz – 1300 MHz	5 μV

IF REJECTION:

610 MHz at 70 MHz	60 dB
608MHz at 1000 MHz	60 dB

SELECTIVITY:

NFM and AM

±9 kHz,	–6 dB
±15 kHz,	–50 dB

WFM

±150 kHz,	–6 dB
±300 kHz,	–50 dB

SCANNING RATE:

Fast 26 channels/sec
Slow 13 channels/sec

PRIORITY SAMPLING:

2 seconds

DELAY TIME:

2 seconds

SQUELCH SENSITIVITY:

NFM and AM

Threshold	25 MHz – 520 MHz	0.5 μV
	760 MHz – 1100 MHz	0.5 μV
	1100 MHz – 1300 MHz	3 μV
Tight S/N	25 MHz – 520 MHz	25 dB
	760MHz – 1100MHz	25 dB
	1100 MHz – 1300 MHz	20 dB

WFM

Threshold	25 MHz – 520 MHz	3 μV
	760 MHz –1100 MHz	3 μV
	1100 MHz – 1300 MHz	15 μV
Tight S/N	25 MHz – 520 MHz	40 dB
	760 MHz – 1100 MHz	40 dB
	1100 MHz – 1300 MHz	40 dB

ANTENNA IMPEDANCE:

50 ohms

AUDIO POWER:

1.3 watts nominal

BUILT-IN SPEAKER:

3" (77 mm) 8 ohms, dynamic type

TAPE OUT (Z= 10 kohm):

600 mV nominal

POWER REQUIREMENTS:

AC 120 Volts 60 Hz 8 watts
DC 13.8 Volts 10 watts

MEMORY BACK-UP BATTERY:

9 Volts

DIMENSIONS:

2 7/8" (76 mm) x 8– /8" (220 mm) x 8 1/4" (205 mm) HWD

WEIGHT:

77.6 oz. (2.2 kg)

Notes:

REALISTIC®

Service Manual

20-145/9145

PRO-2006
Programmable Scanner

Catalog Number:20-145/9145

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PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by a ⚠ in the schematic diagram and the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

RADIO SHACK
A Division of Tandy Corporation
Fort Worth, Texas 76102

4A0

Printed in Japan

			UNIT	NOMINAL	LIMIT
Signal to Noise Ratio	NFM and AM	25 MHz – 520 MHz	dB	40	30
	DEV.: 3 kHz at 1 kHz	760 MHz – 1100 MHz	dB	40	30
	MOD.: 60% at 1 kHz	1100 MHz – 1300 MHz	dB	35	25
	INPUT: 100 μV				
	WFM	25 MHz – 520 MHz	dB	45	35
	DEV.: 22.5 kHz at 1 kHz	760 MH – 1100 MHz	dB	45	35
	INPUT: 100 μV	1100 MHz – 1300 MHz	dB	45	35
Residual Noise (Vol. Min.)			mV	3	5
Scanning Speed	Slow		channels/sec	13	12–14
	Fast		channels/sec	26	24–28
Scan delay time			sec	2	1.5–2.5
Audio Output Power	T.H.D. 10%		watts	1.3	1.0
Channels of Operation	Any 400 channels in any band combination				

Channels, Frequency and Mode display Liquid crystal display

Receiving System Direct Key entry Digital-Controlled Synthesizer, Superheterodyne
1st IF (607.505 – 611.5 MHz) Upper side 1st local frequency
2nd IF (48.5 MHz) Lower side 2nd local frequency
3rd IF (10.7 MHz) for Wide FM mode
Lower side 3rd local frequency
3rd IF (455 MHz) for Narrow FM and AM mode
Lower side 3rd local frequency

Power Source AC 120 V, 60 Hz, 18 W
DC 13.8 V, 10 W

Jacks Headphone, External speaker, Tape output and "BNC" type antenna connector

Note: Nominal specs represent the design specs. All units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable. In no case should a unit fail to meet limit specs.

SPECIFICATIONS

Frequency Range

25.000 MHz – 520.000 MHz
760.000 MHz – 823.945 MHz
851.000 MHz – 868.945 MHz
896.000 MHz – 1300.000 MHz

			UNIT	NOMINAL	LIMIT
Sensitivity	NFM: (S + N)/N = 20 dB	25 MHz – 520 MHz	μV	0.5	2
	DEV.: 3 kHz at 1 kHz	760 MHz – 1100 MHz	μV	0.5	2
		1100 MHz – 1300 MHz	μV	3	10
	AM: (S + N)/N = 20 dB	25 MHz – 520 MHz	μV	2	5
	MOD.: 60% at 1 kH	760 MHz – 1100 MHz	μV	2	5
		1100 MHz – 1300 MHz	μV	5	20
	WFM: (S + N)/N = 30 dB	25 MHz – 520 MHz	μV	3	10
	DEV.: 22.5 kHz at 1 kHz	760 MHz – 1100 MHz	μV	3	10
		1100 MHz – 1300 MHz	μV	10	25
Squelch Sensitivity	NFM and AM				
	Threshold	25 MHz – 520 MHz	μV	0.5	2
		760 MHz – 1100 MHz	μV	0.5	2
		1100 MHz – 1300 MHz	μV	3	10
	Tight: (S + N)/N	25 MHz – 520 MHz	dB	25	15
		760 MHz – 1100 MHz	dB	25	15
		1100 MHz – 1300 MHz	dB	20	10
	WFM				
	Threshold	25 MHz – 520 MHz	μV	3	10
		760 MHz – 1100 MHz	μV	3	10
		1100 MHz – 1300 MHz	μV	15	30
	Tight: (S + N)/N	25 MHZ – 520 MHz	dB	40	30
		760 MHz – 1100 Mhz	dB	40	30
		1100 MHz – 1300 MHz	dB	40	30
Selectivity	NFM and AM:	–6 dB	kHz	± 9	± 12
		–50 dB	kHz	± 15	± 18
	WFM	–6 dB	kHz	± 150	± 200
		–50 dB	kHz	± 300	± 400
Spurious Rejection	at 328 MHz (NFM)		dB	40	35
If Rejection	610 MHz at 70 MHz (NFM)		dB	60	40
	608 MHz at 1000 MHz (NFM)		dB	60	40
Modulation Acceptance	EIA RS204A		kHz	± 8	± 5

PRINCIPLES OF OPERATION

The PRO-2006 is a Phase Locked Loop (PLL) synthesized VHF/UHF, AM/FM receiver controlled by a Central Processing Unit (CPU) via a keyboard.

Receiving mode and search step are initially set to correspond with the frequencies entered. When a frequency within FM broadcast band is keyed in, receiving mode is set to wideband FM (WFM). When a frequency in active radio band, police, fire, ham radio etc.is keyed in, the mode is set to narrowband FM (NFM), and when a frequency in aircraft and CB band is keyed in, it sets to AM mode. Also the mode and step can be changed by MODE, STEP Keys.

The CPU (IC501) controls receiving frequency range, frequency determination, scanning speed and delay time etc. The CPU is able to do only the assigned functions, and no modification of the CPU is feasible.

The following paragraphs explain the operation of the circuit in terms of the functional blocks:

RF input circuit comprises 10 dB attenuator and bandpass filter. A signal generated by VCO1 or VCO2 is applied to double balanced mixer (D.B.M.) via low-pass or high-pass filter and mixed with the RF signal. The D.B.M. is employed to facilitates 25 MHz to 1300 MHz mixing.

The 1st IF (Q6) is 607.505 MHz to 611.500 MHz, and the signal is mixed with VCO3 frequency at the 2nd mixer (Q7) to produce 48.5 MHz signal, which is applied to WFM IF (Q9) or AM/NFM IF (Q15,Q16). Corresponding with input from the keyboard, CPU determines which of VCO1 or VCO2 WFM IF, AM/NFM, AM IF, Data of PLL circuit to be functioned. and outputs the necessary data.

A signal entered to AM/NFM IF is mixed with X'tal oscillation frequency 48.045 MHz at the 3rd mixer (IC2) and converted to 455 kHz signal. A signal entered to WFM IF is mixed with X'tal oscillation frequency 37.8 MHz at the 3rd mixer (Q11) and converted to 10.7 MHz signal. The signals are further amplified and detected to AF signal.

AF signals of WFM, AM and NFM are CPU controlled and applied to AF power amplifier (IC7) via switching circuit. Squelch signal is comprised of noise product from WFM/NFM detector output, and amplified by IC2 to switching signal, which controls AF mute and CPU.

Any unstable supply voltage to the CPU can produce CPU mal-functions, such as wrong data processing, wrong data transfer, etc. To overcome this, C508 and R517 "initialize" the CPU. Initialization is done when RESTART switch is pushed. Figure A shows initializing waveform.

CX501 (12.0 MHz) is a clock which is used for CPU control. Figure B shows 1/4 divided waveform at Pin 28 of IC501.

CPU output data display frequency and function etc. on LCD. LCD is back lighted with Electro Luminescence, which works with 70 V rms, 300 Hz A.C.

Power supply comprises DC 30 V, 8 V and two 5 V lines.

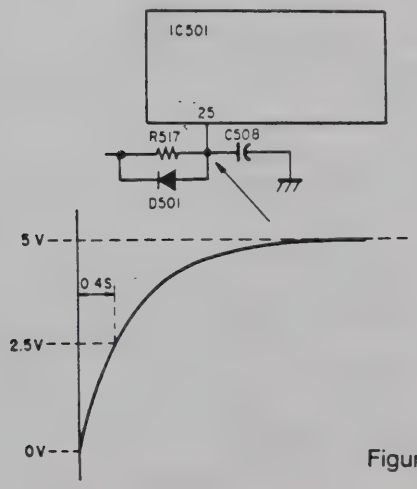


Figure A

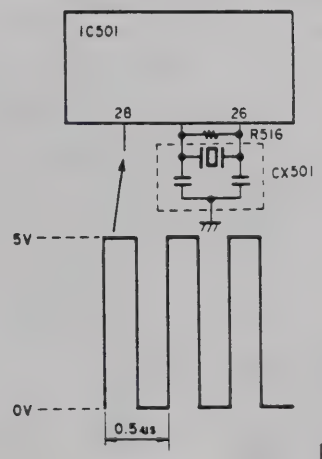
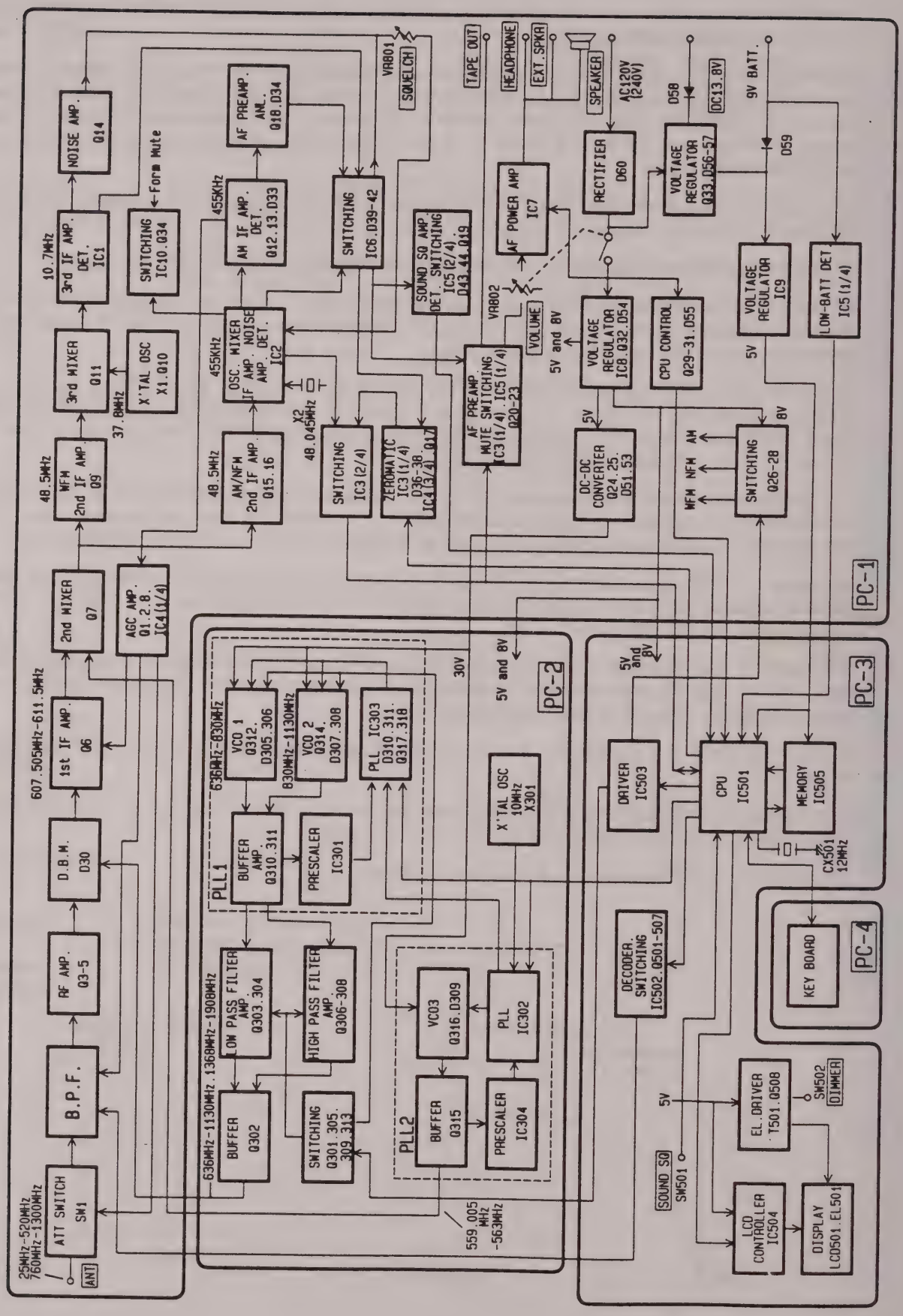


Figure B

BLOCK DIAGRAM



*1

Enter the desired frequency in each channel as follows:

Enter the desired frequency with numeral keys.

Press [ENTER] to memorize the frequency.
If wrong frequency (out of the band) is entered, "ERROR" is displayed. Press [CLEAR] and then enter the correct frequency.

Press [PROGRAM].
Advance to next channel. Enter the frequency and press [ENTER], repeat it to memorize frequencies one by one.

Press [PRI] so that priority channel appears.

To revert to the previous channel, press [PRI] again.

Press numeral keys (1 thru 400) and then press [PRI].
Priority channel is set to entered new channel.

To call monitor channels, press [MONITOR].

Press [MONITOR] so that next monitor channel appears.

To call the monitor channels directly, press numeral keys.

To revert to the previous channel, press [PROGRAM].

*2

Enter search frequency as follows.

Press [LIMIT] (or numeral key and [LIMIT]) and enter lower frequency with numeral keys.

Press [ENTER].

Press [LIMIT] and enter upper frequency.

Press [ENTER].

To change mode, press [MODE].
The mode chenges in the order of AM–NFM–WFM.

To change step, press [STEP].
The step changes 5 kHz – 12.5 kHz – 50 kHz.

To return to the initial setting of mode and step, press [RESET].

Press [▲] to search from lower frequency.
Press [▼] to search from upper frequency.
(squelch must be on)

Press [MONITOR] to store the desired frequency (10 monitor channels) in the search mode.

Press [ENTER] to store the desired frequency in the indicated channel.
Search operation starts.

GENERAL OPERATION OUTLINE

Turn power SW on.
Automatically sets to SCAN mode and starts scanning when the SQ is on.

When battery voltage drops. "BATT" is indicated and peep-tone sounds from speaker.

Press RESTART SW located at the rear panel.

Scan Banks 1 through 10 are displayed. If there is any blank scan bank, press the number key to light all scan banks, and to blink one of them in one after another.

Press [1] through [9] key. Scan Bank 1 through 9 will disappear.

Press [0] key. No response.

Press [1] through [9] key and [0] key. Scan Banks 1 through 9 are displayed except 10.

Press [SPEED] so that Scan speed is changed in two speeds, fast or slow.

Press [SPEED] so that Scan speed is changed to the other.

To obtain priority operation in Scan mode, press [PRI].

To release priority operation, press [PRI] again.

Press [MANUAL]. When [MANUAL] is pressed again, the channel advances. To select one of 1 through 400 channels, push the number key and then push [MANUAL].

To start Direct Search, press [DIRECT], then press [▼] or [▲] key. No reaction when the frequency is 000.0000.

Press [MANUAL].

To hold the channel,press [DELAY].
(when this channel is not set to [DELAY].)

To release the delay function, press [DELAY] again.

To skip certain frequency, press [L/OUT].
(when this channel is not set to [L/OUT].)

To release the lock out function, press [L/OUT] again.

To call locked out channels, press [L/O RVW] (This function is available when locked out channels exist.)

To priority operation in manual mode, press [PRI].

To release the priority function, press [PRI] again.

Press [PROGRAM] to set to program mode.

*1 *2

Alignment Preparation

Test equipment required

Oscilloscope
AC SSVM
DC SSVM
8-ohm dummy load
AM. FM. Signal Generator (25 to 1300 MHz)
Distortion Meter

Note:

- Use non-metallic tuning tools.
- The test equipment and Receiver should be warmed up at least 15 minutes before proceeding to alignment.
- The signal level from the Generator should be kept as low as possible obtain usable output.

Program CH1 to CH10 as follows.

Channnel	Frequency (MHz) and MODE	Channel	Frequency (MHz) and MODE
1	804.500 (NFM)	6	120.000 (AM)
2	220.495 (NFM)	7	300.495 (NFM)
3	520.000 (NFM)	8	240.495 (NFM)
4	250.000 (NFM)	9	800.495 (NFM)
5	98.000 (WFM)	10	800.500(NFM)

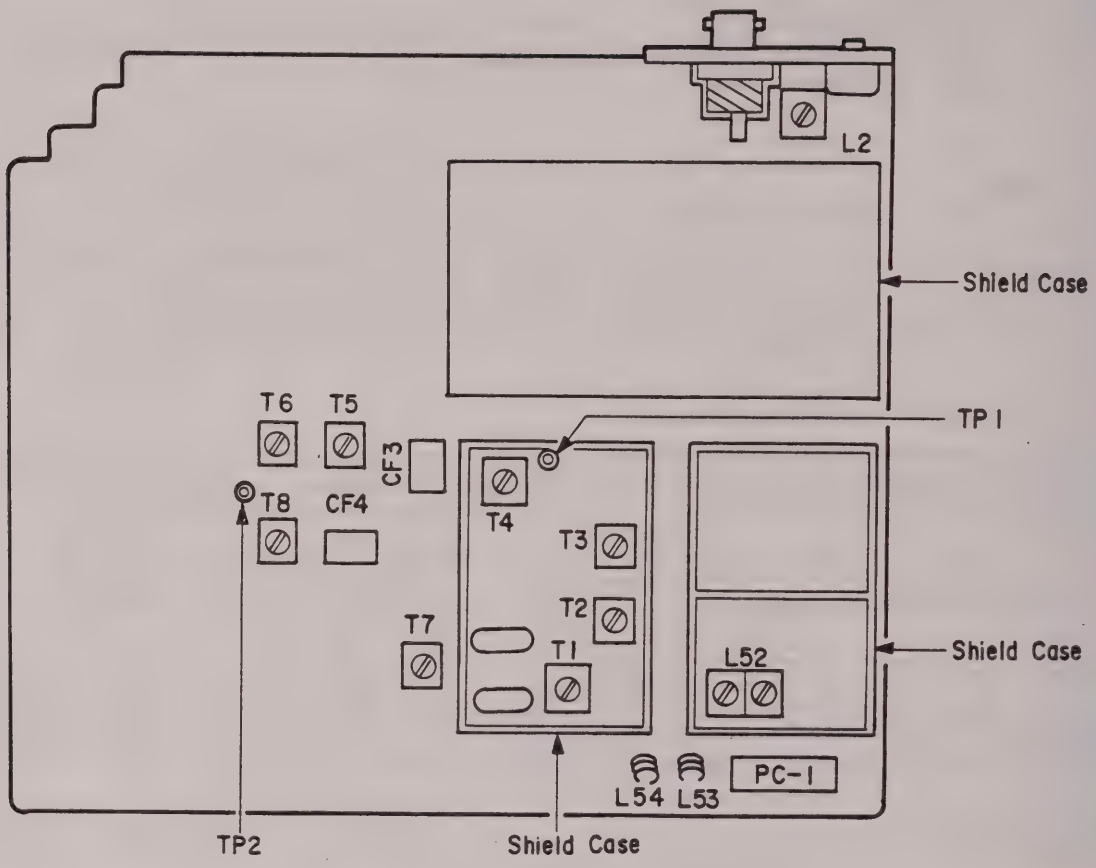
Table 1

ALIGNMENT

Alignment and Test Points

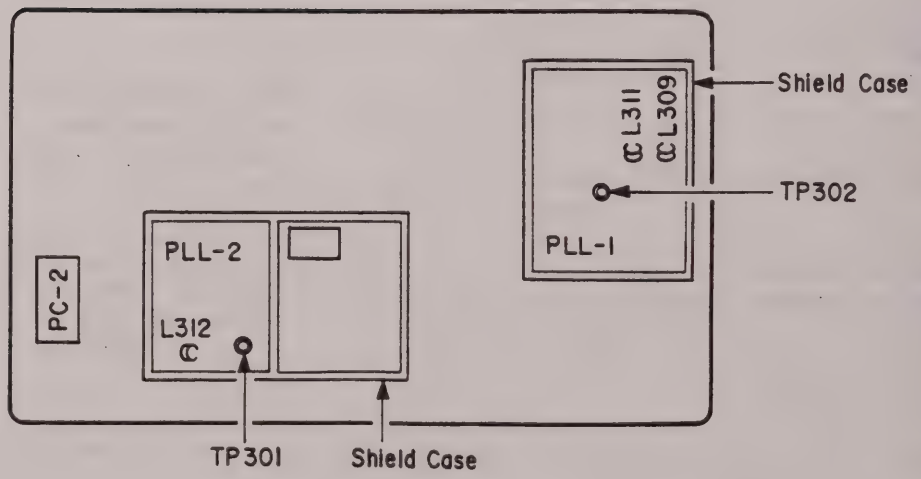
Linear PCB

PC-1



PLL PCB

PC-2



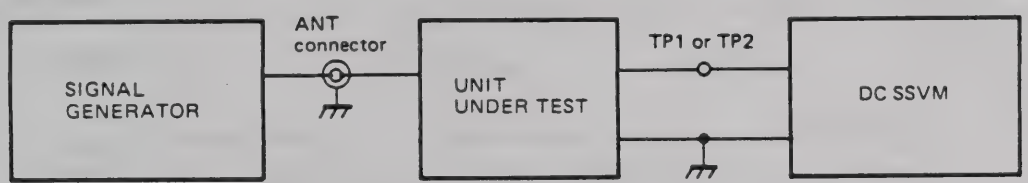
Alignment of 455 kHz NFM Discriminator coil

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
3	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 4.	Connect Signal Generator to ANT connector and DC SSVM to TP2 (Figure 6).	T8	Set the Signal Generator frequency to 250 MHz, 100 μV output (NO MOD) and adjust T8 for 3.8 V (± 0.1) on the DC SSVM.

Alignment of 10.7 MHz WFM Discriminator coil

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
4	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 5.	Connect Signal Generator to ANT connector and DC SSVM to TP1 (Figure 6).	T4	Set the Signal Generator frequency to 98 MHz, 100 μV output (NO MOD) and adjust T4 for 3.9 V (± 0.1)on the DC SSVM.

Figure 6



Alignment of 48.5 MHz and 10.7 MHz WFM IF coil

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
5	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 5.	Connect Signal Generator to ANT connector, and oscilloscope, AC SSVM, distortion meter and 8 ohm load to EXT SPKR jack. (Figure 7)	T2 T3	1) Set the Signal Generator frequency to 98 MHz. FM: 22.5 kHz Dev. at 1 kHz and output at S/N 20 dB point. 2) Adjust T2 and T3 for maximum sensitivity.

Alignment of 48.5 MHz 2nd IF coil

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
6	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 6.	Same as step 5.	T1 T7	1) Set the Signal Generator frequency to 120 MHz. AM: 60% Mod. at 1 kHz and output at S/N 20 dB point. 2) Adjust T1 and T7 for maximum sensitivity.

Alignment Procedures

Alignment of VCO (PLL 2)

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
1	OFF/VOLUME control: ON SQUELCH control: Fully CCW (counterclockwise) Select channel 1.	Connect DC SSVM to TP301 (Figure 1)	L312	Adjust L312 for 3V on the DC SSVM. See Table2.

Alignment of VCO (PLL 1)

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
2	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 2 and 3.	Connect DC SSVM to TP302 (Figure 2)	L309 L311	1) Select channel 2 and adjust L309 for 20 V on the DC SSVM. See Table 2. 2) Select channel 3 and adjust L311 for 19 V in the DC SSVM See Table 2.

Figure 1

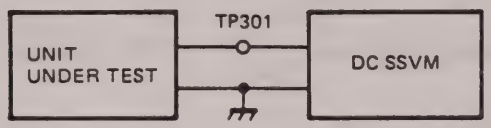


Figure 2

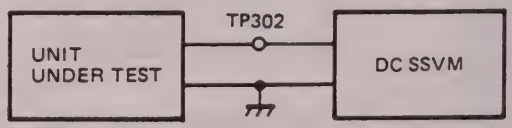
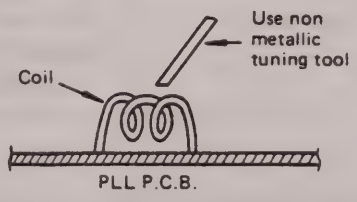
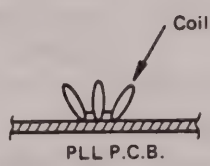
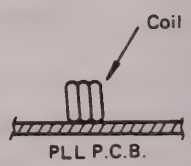


Table 2

Coil L309, L311, L312	Coil alignment (open)	Coil alignment (close)
Figure 3  	Figure 4  	Figure 5 
Note: • Perform coils interval alignment delicately because it greatly affects the frequency . • Fix the coils with glue after alignment and then repeat the ALIGNMENT PROCEDURES Step 1 and Step 2. After checking the fixation and temperature being normal.	* Open the coil as shown above by using non metallic tuning tool when the measuring voltage at TP301 or TP302 is higher than the setting voltage.	* Close the coil as shown above by using non metallic tuning tool when the measuring voltage as TP301 or TP302 is lower than the setting voltage.

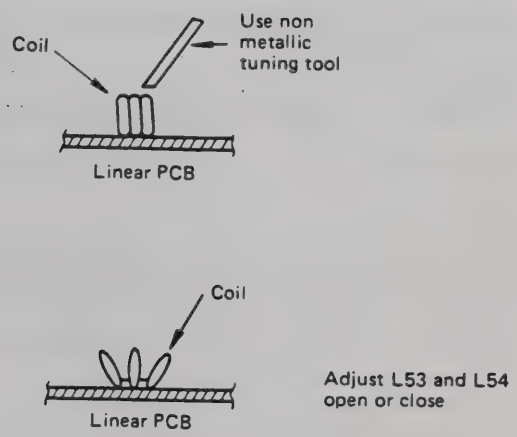
Alignment of IF TRAP coils

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust.	Remarks
9	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 7.	Same as step 5	L2	1) Set the Signal Generator frequency to 609.505 MHz. FM: 3 kHz Dev. 1 kHz Mod. Output approx. 300 uV. 2) Adjust L2 to maximum sensitivity.

Alignment of 512 MHz TRAP coil

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
10	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 8.	Same as step 5	L53 L54	1) Set the Signal Generator frequency to 337.495 MHz. FM: 3 kHz Dev. 1 kHz Mod. Output approx. 3 mV. 2) Adjust L53 and L54 to minimum sensitivity. See Figure 8.

Figure 8



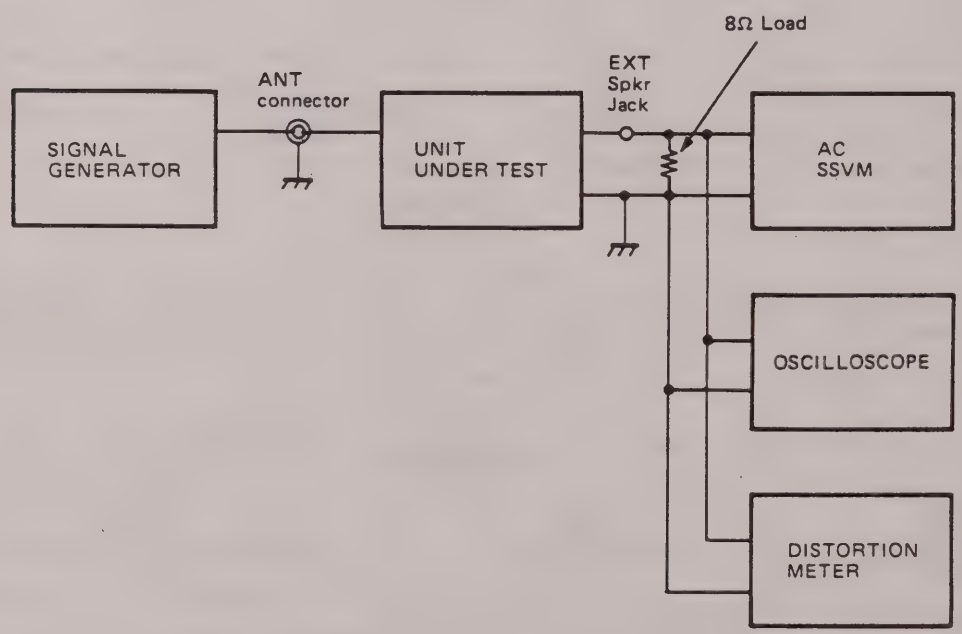
Alignment of 455 kHz IF coil

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
7	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 6.	Connect Signal Generator to ANT connector and oscilloscope, AC SSVM, Distortion meter and 8 ohm load to EXT SPKR jack.(Figure 7)	T5	1) Set the Signal Generator frequency to 120 MHz. AM: 60% Mod. at 1 kHz and output at S/N 20 dB point. 2) Adjust T5 to maximum sensitivity.

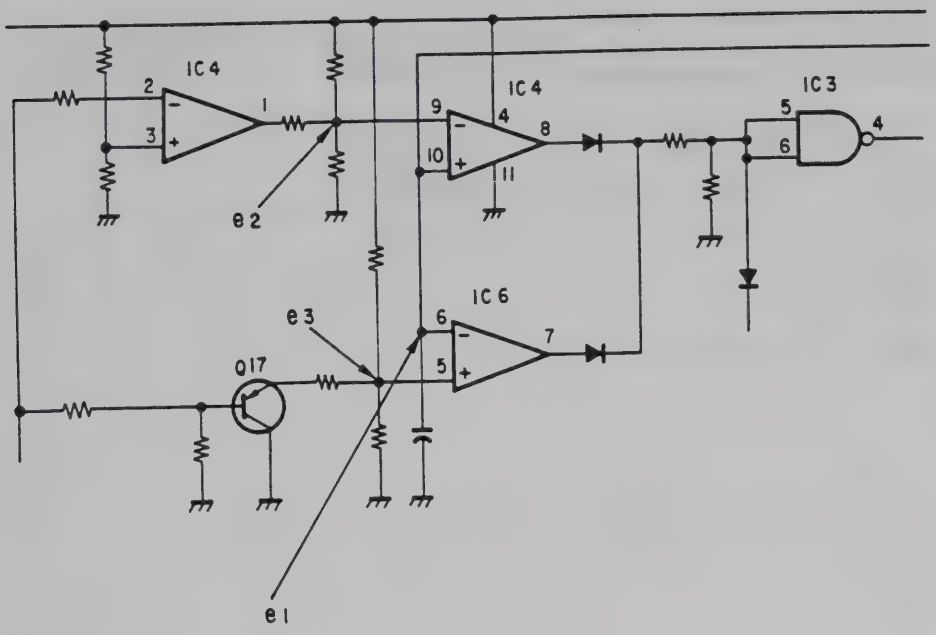
Alignment of 455 kHz AM DET. coil

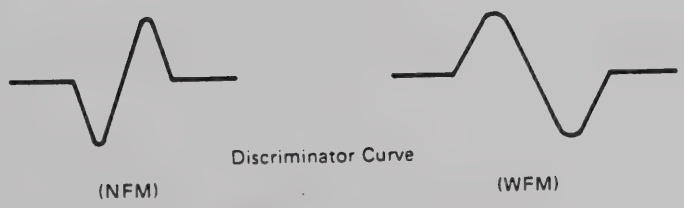
Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
8	Same as step 7	Same as step 7	T6	1) Set the Signal Generator frequency to 120 MHz. AM: 60% Mod. at 1 kHz and output at 100 μV. 2) Adjust T6 to minimum T.H.D. point.

Figure 7



Zeromatic Function Test Procedure





Discriminator Curve

(NFM) (WFM)

(Zeromatic functions when OUTPUT is in "H" level.)

	0 < e1 < e3	e3 < e1 < e2	e2 < e1 < VCC
OUTPUT (IC3 Pin No. 4)	L	H	L

(NFM MOD.)

To adjust e1 voltage, receive signal in Manual mode, and set T8 to obtain 3.8 V (+ 0.1 V) at TP2. It is convenient to use the National Weather Service signal for the adjustment.

(WFM MOD.)

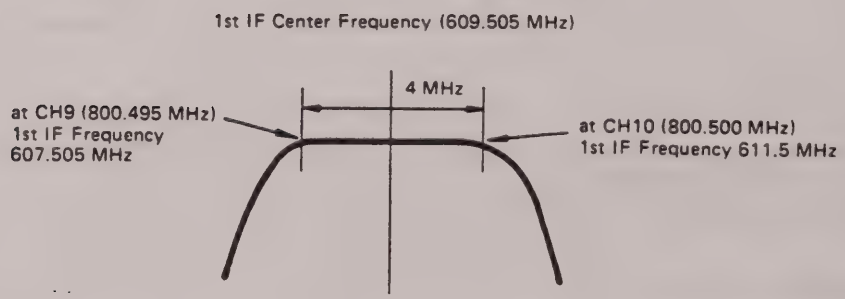
To adjust e1 voltage, receive signal in Manual mode and set T4 to obtain 3.9 V (+ 0.1 V) at TP1. It is convenient to use the FM or TV sound signal for the adjustment.

Note: Alignment of L52 (HF-62H14 B.P.F. coil)
Do not adjust this coil because of L52 is already adjusted at factory.
If the coil is moved by mistake, adjust it as per below.
B.P.F. characteristic is Figure 9.

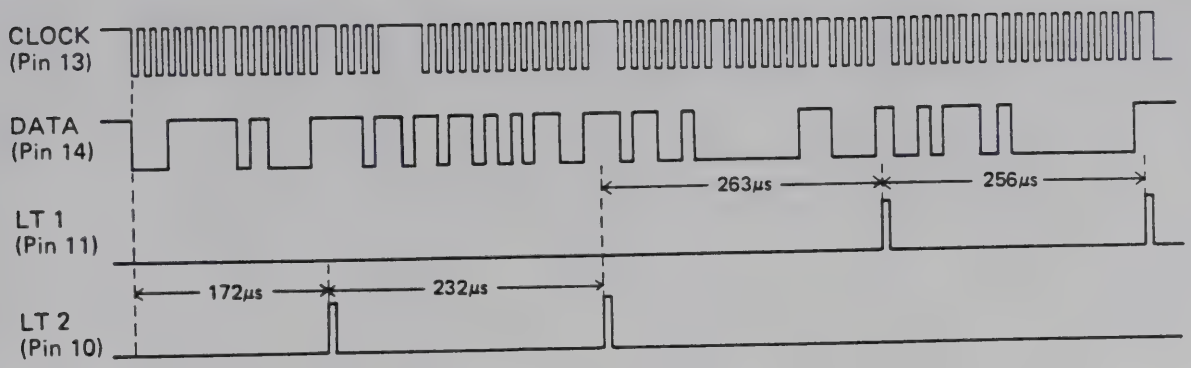
Alignment 1st IF (611.5 to 607.505 MHz) B.P.F. coil

Step	Control Setting Channel Programming	Test Instrument Connection	Adjust	Remarks
11	OFF/VOLUME control: ON SQUELCH control: Fully CCW Select channel 9 and 10.	Same as step 7	L52	1) Select channel 9 and set the Signal Generator frequency to 800.495 MHz. FM: 3 kHz Dev. at 1 kHz and 1 μV output. 2) Adjust L52 to maximum sensitivity. 3) Select channel 10 and set the Signal Generator frequency to 800.500 MHz. FM: 3 kHz Dev. at 1 kHz and 1 μV output. 4) Readjust L52 to maximum sensitivity. NOTE: Align the balance of CH 9, CH10 sensitivity to become same.

Figure 9

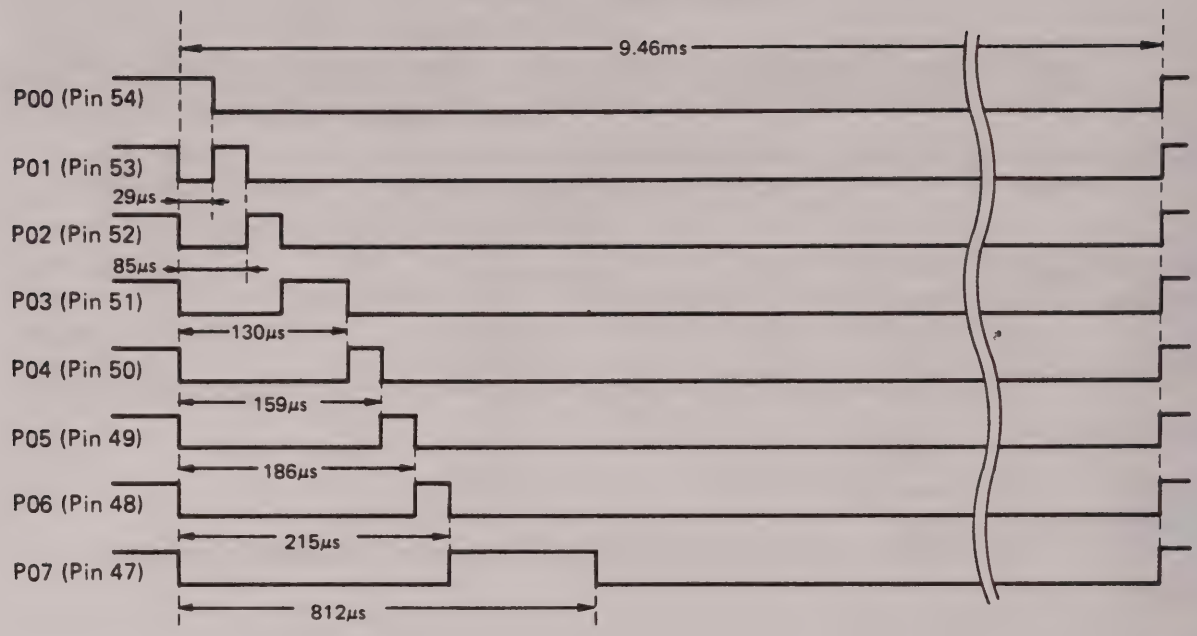


PLL Data Waveform



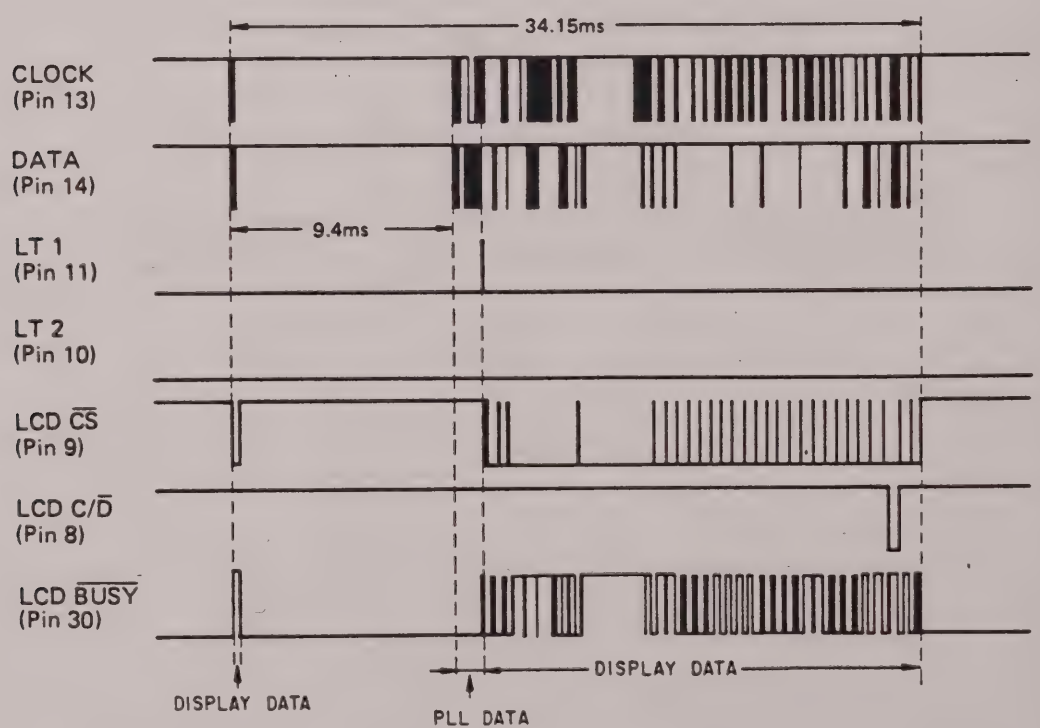
Note: Data in Program mode when 150.000 MHz is entered.

Key Access Pulse Output (IC501)

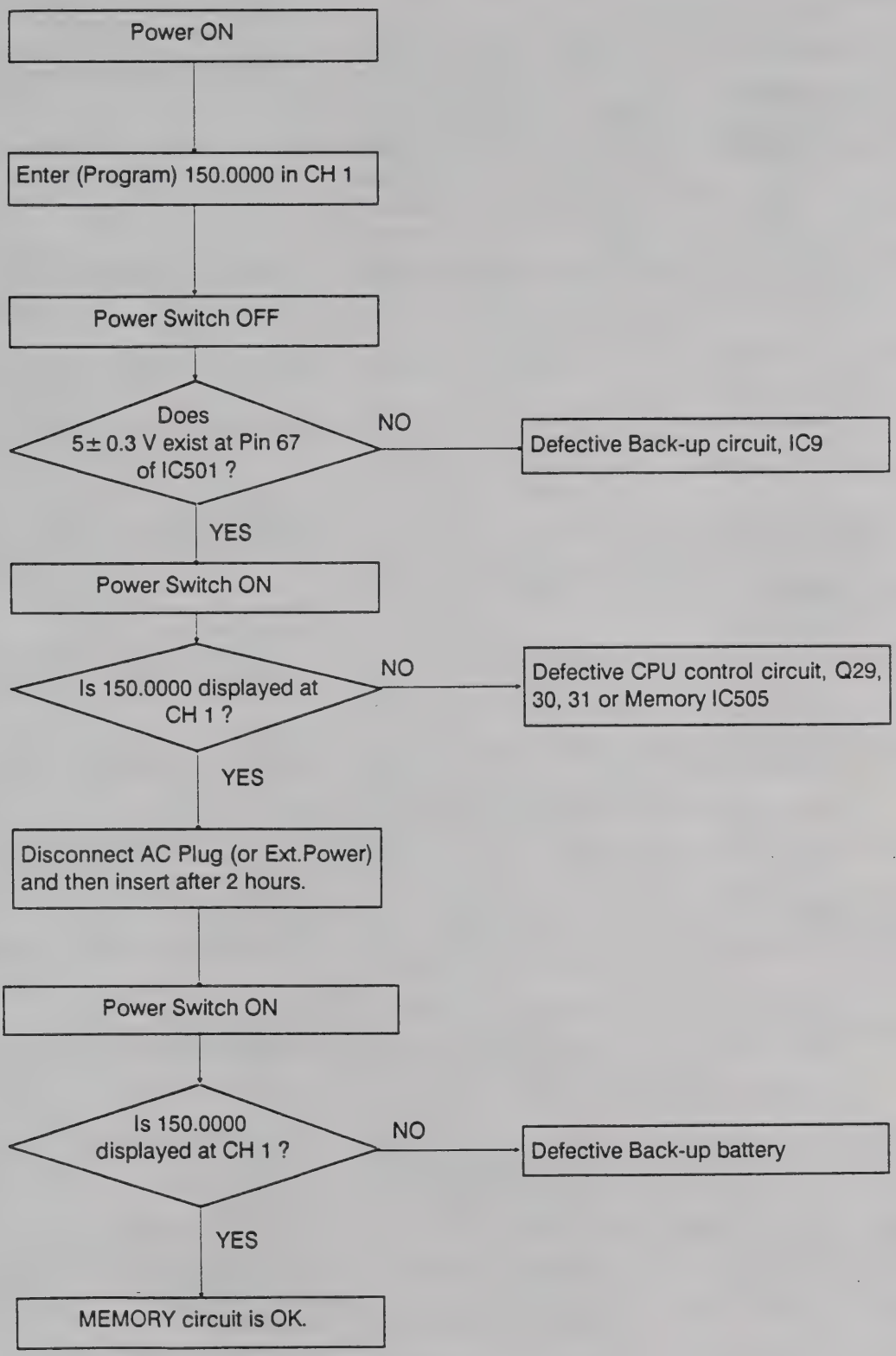


Note: Use a signal at P01 of IC501 as trigger, and then observe the keys access pulse when [PROGRAM] key is pressed.

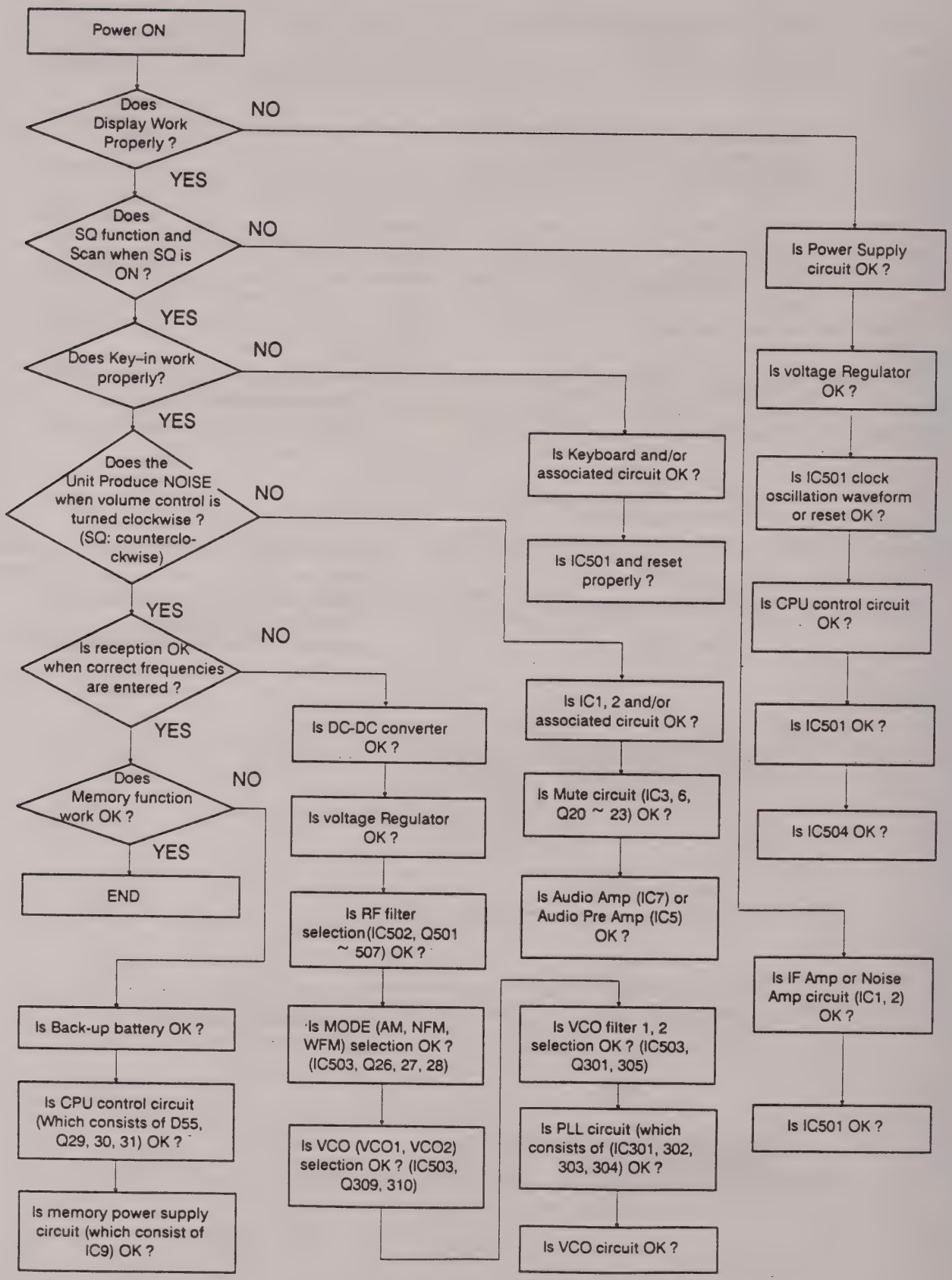
Data Waveform (IC-501)



MEMORY CHECK


Power ON
Enter (Program) 150.0000 in CH 1
Power Switch OFF
Does 5± 0.3 V exist at Pin 67 of IC501 ?
NO
Defective Back-up circuit, IC9
YES
Power Switch ON
Is 150.0000 displayed at CH 1 ?
NO
Defective CPU control circuit, Q29, 30, 31 or Memory IC505
YES
Disconnect AC Plug (or Ext.Power) and then insert after 2 hours.
Power Switch ON
Is 150.0000 displayed at CH 1 ?
NO
Defective Back-up battery
YES
MEMORY circuit is OK.

RECEPTION CHECK


Power ON
Does Display Work Properly ?
NO
YES
Does SQ function and Scan when SQ is ON ?
NO
YES
Does Key–in work properly?
NO
YES
Does the Unit Produce NOISE when volume control is turned clockwise ? (SQ: counterclo-ckwise)
NO
YES
Is reception OK when correct frequencies are entered ?
NO
YES
Does Memory function work OK ?
NO
YES
END
Is Back-up battery OK ?
Is CPU control circuit (Which consists of D55, Q29, 30, 31) OK ?
Is memory power supply circuit (which consist of IC9) OK ?
Is DC-DC converter OK ?
Is voltage Regulator OK ?
Is RF filter selection(IC502, Q501 ~ 507) OK ?
Is MODE (AM, NFM, WFM) selection OK ? (IC503, Q26, 27, 28)
Is VCO (VCO1, VCO2) selection OK ? (IC503, Q309, 310)
Is Keyboard and/or associated circuit OK ?
Is IC501 and reset properly ?
Is IC1, 2 and/or associated circuit OK ?
Is Mute circuit (IC3, 6, Q20 ~ 23) OK ?
Is Audio Amp (IC7) or Audio Pre Amp (IC5) OK ?
Is VCO filter 1, 2 selection OK ? (IC503, Q301, 305)
Is PLL circuit (which consists of (IC301, 302, 303, 304) OK ?
Is VCO circuit OK ?
Is Power Supply circuit OK ?
Is voltage Regulator OK ?
Is IC501 clock oscillation waveform or reset OK ?
Is CPU control circuit OK ?
Is IC501 OK ?
Is IC504 OK ?
Is IF Amp or Noise Amp circuit (IC1, 2) OK ?
Is IC501 OK ?

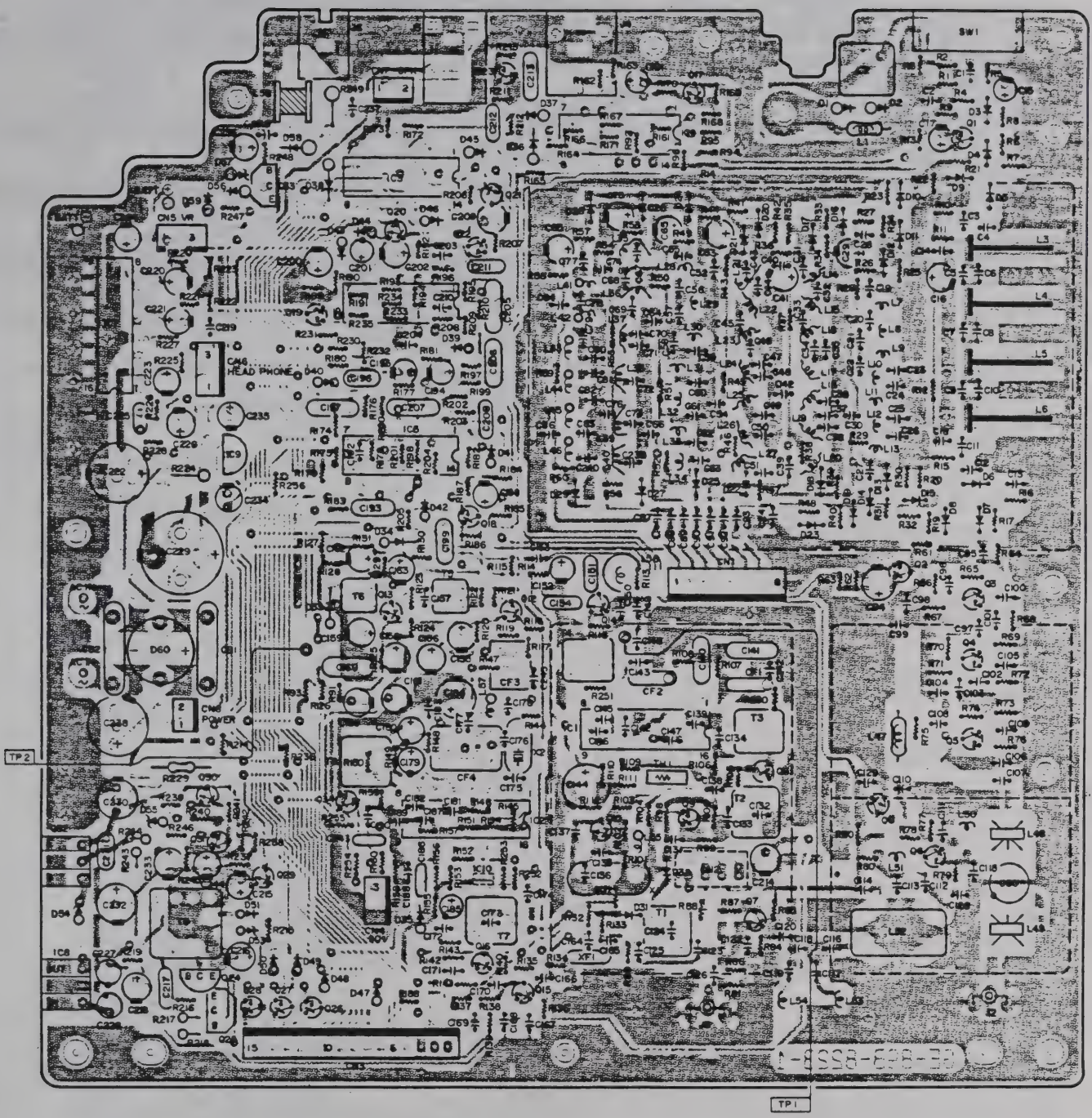
Symptom	Cause/Remedy
No sound in AM mode but NFM and WFM operate.	1) Defective IC501 or IC503: Replace. 2) Defective switching circuit which consists of Q28, D41, D50: Replace the defective components. 3) Defective ANL,AF pre amp. circuit which consists of Q18, D34: Replace the defective components. 4) Defective AM IF DET.circuit which consists of Q12, Q13, D33: Replace the defective components.
No sounds in NFM mode but AM and WFM operate.	1) Defective IC501 or IC503: Replace. 2) Defective switching circuit which consists of Q27, D40, D49: Replace the defective components.
No sound in AM and NFM modes but WFM operates.	1) Defective IC2: Replace.
No sound in WFM mode but AM and NFM operate.	1) Defective IC501,503 or IC1: Replace. 2) Defective switching circuit which consists of Q26, D48: Replace the defective components.
Low sensitivity between 25.0000 and 39.9950 MHz.	1) Defective decoder switching circuit which consists of IC502, Q501: Replace the defective components. 2) Defective Bandpass filter (B.P.F.): Replace the defective components.
Low sensitivity between 40.0000 and 67.9950 MHz.	1) Defective decoder switching circuit which consists of IC502, Q502: Replace the defective components. 2) Defective B.P.F.: Replace the defective components.
Low sensitivity between 68.0000 and 107.9950 MHz.	1) Defective decoder switching circuit which consists of IC502, Q503: Replace the defective components. 2) Defective B.P.F.: Replace the defective components.
Low sensitivity between 108.0000 and 173.9950 MHz.	1) Defective decoder switching circuit which consists of IC502, Q504: Replace the defective components. 2) Defective B.P.F.: Replace the defective components.
Low sensitivity between 174.0000 and 279.9950 MHz.	1) Defective decoder switching circuit which consists of IC502, Q505: Replace the defective components. 2) Defective B.P.F.: Replace the defective components.
Low sensitivity between 280.0000 and 520.0000 MHz.	1) Defective decoder switching circuit which consists of IC502, Q506: Replace the defective components. 2) Defective B.P.F.: Replace the defective components.
Low sensitivity between 760.0000 and 1300.0000 MHz.	1) Defective decoder switching circuit which consists of IC502, Q507: Replace the defective components. 2) Defective B.P.F.: Replace the defective components.
Does not operate between 25.0000 and 220.4950 MHz or 760.0000 and 1052.4950 MHz.	1) Defective IC501 Pin 46, IC503, Q309 and/or VCO1 circuit: Replace the defective components.

TROUBLESHOOTING

Symptom	Cause/Remedy
Display does not light and no sound when POWER is ON. Volume control: MAX. Squelch control: CCW (countorclockwise)	1) Defective AC line cord: Replace. 2) Defective Power transformer T801: Replace. 3) Defective Off/Volume control VR802: Replace. 4) Defective Rectifier D60: Replace. 5) Defective Voltage regulator circuit: Replace the defective components. 6) Defective CPU control circuit which consists of Q29, Q30, Q31, D55: Replace the defective components.
Displays but no sound.	1) Defective speaker or headphone jack: Replace. 2) Defective audio amp. circuit which consists of IC7: Replace the defective components. 3) Defective IF amp. circuit which consists of IC1, IC2: Replace the defective components. 4) Defective Squelch control circuit which consists of IC3, IC6: Replace the defective components. 5) Defective AF pre amp. circuit which consists of IC5: Replace the defective components. 6) Defective audio mute switching circuit which consists of IC3, IC5, Q20, Q21, Q22 and Q23: Replace the defective components. 7) Defective switching circuit which consists of IC6, D39, D40, D41, and D42: Replace the defective components.
Sound comes out but display does not light.	1) IC501 is running "wild": Press RESTART Switch. 2) Defective initiate control circuit: Replace the defective components. 3) Defective voltage regulator circuit which consists of IC9: Replace the defective components. 4) Defective LCD: Replace. 5) Defective CPU circuit which consists of IC501: Replace the defective components. 6) Defective LCD controller circuit with consists of IC504: Replace the defective components.
Backlight does not light.	1) Defective EL Driver circuit which consists of T501, Q508: Replace the defective components. 2) Defective EL: Replace.
Does not squelch and does not scan.	1) Defective switching circuit which consists of IC3: Replace IC3. 2) Defective IC2 squelch control output terminal: Replace IC2. 3) Defective voltage regulator circuit which consists of Q32, D54: Replace the defective components.
Squelch operates but does not scan.	1) IC501 is running "wild": Press RESTART Switch. 2) Defective CPU circuit: Replace the defective components.
Operates in MANUAL but does not operate in SCAN.	1) Squelch control is not adjusted correctly: Adjust Squelch (VR801).
Displays but PROGRAM does not operates.	1) Defective keyboard or connector and/or associated circuit: Replace the defective components.

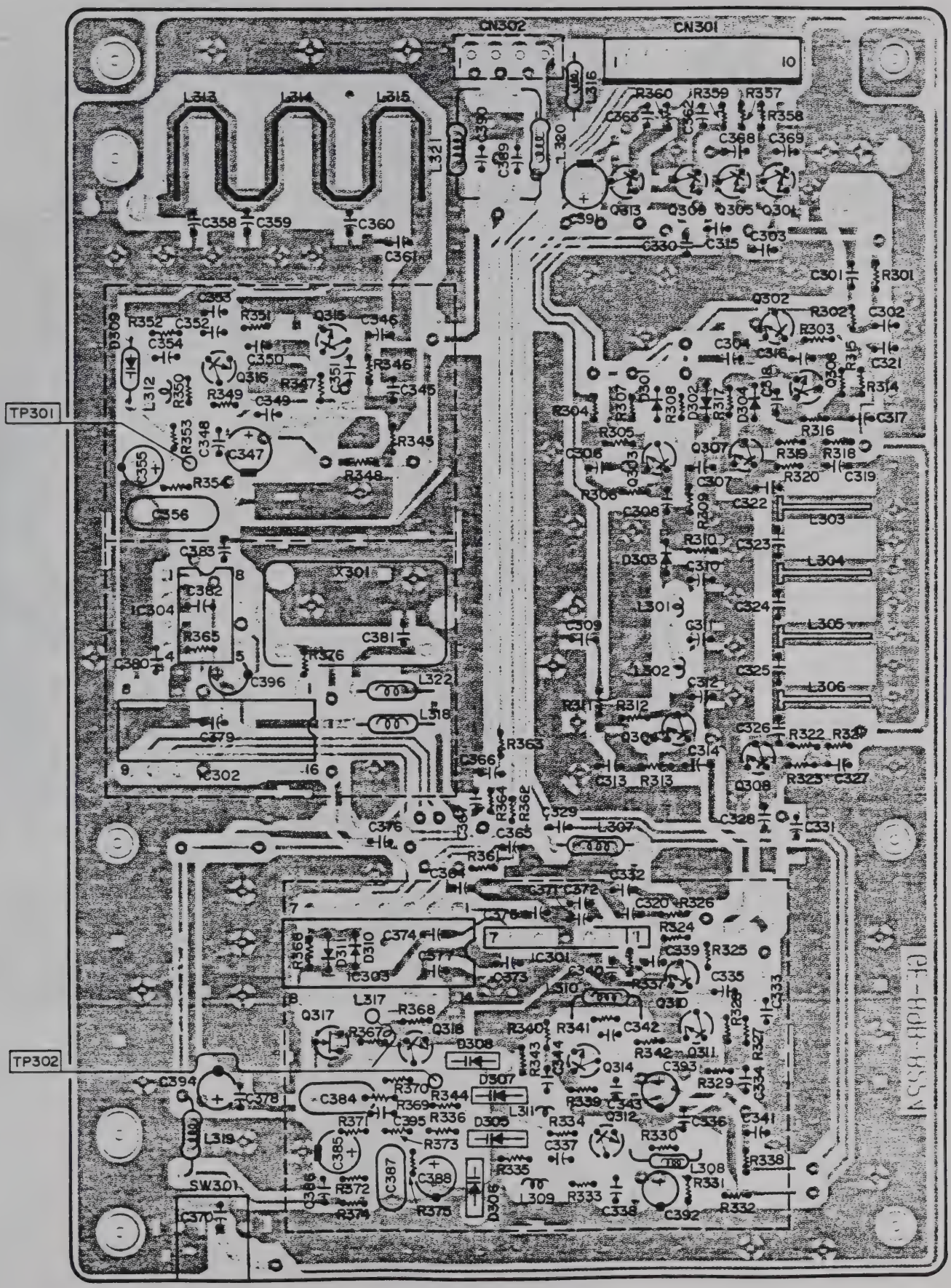
Insert
24, 26, 28,
and 30

LINEAR PCB (Top View)

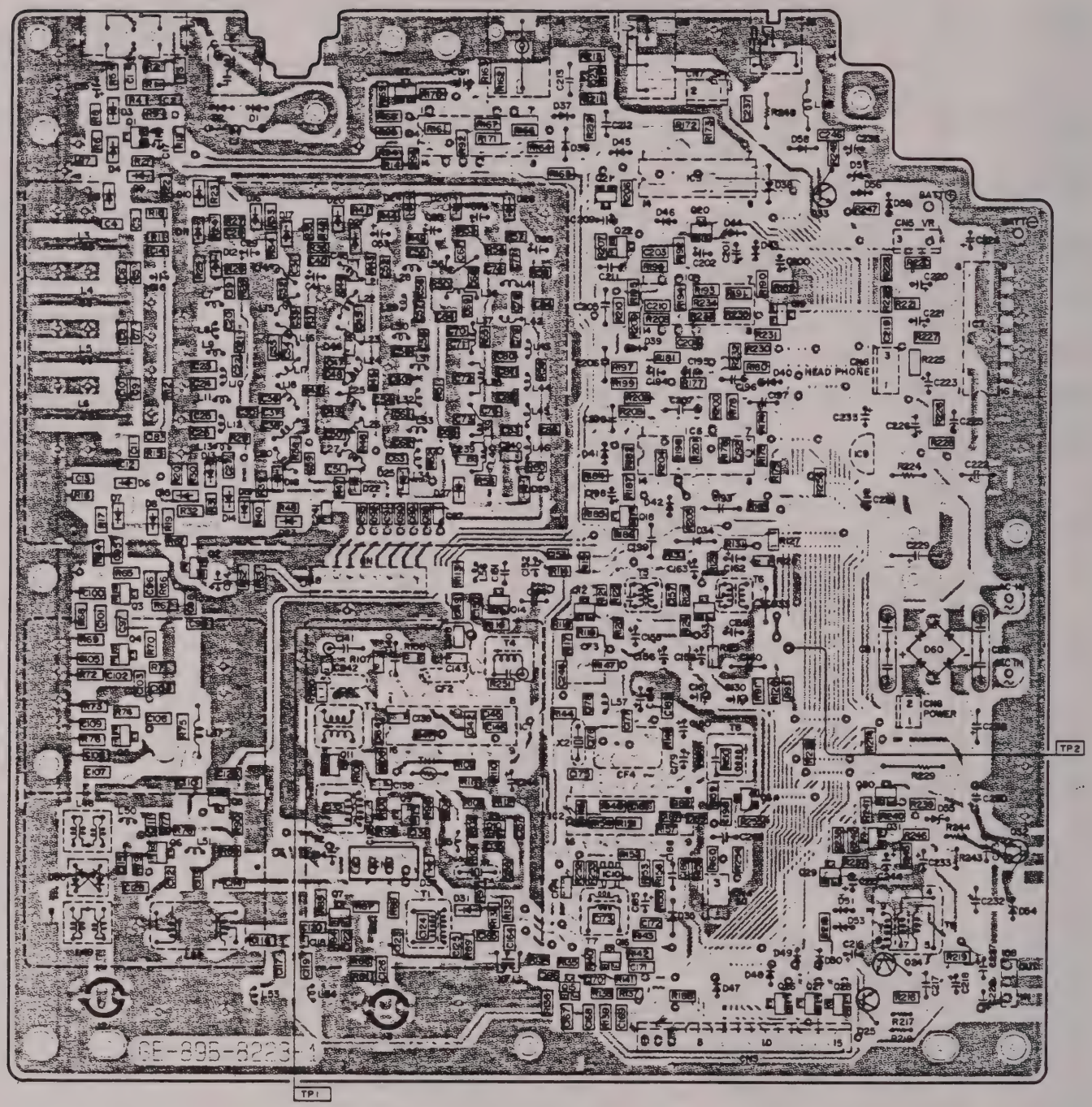


Symptom	Cause/Remedy
Does not operate between 220.0000 and 520.0000 MHz or 1052.5000 and 1300.0000 MHz.	1) Defective IC501 pin 45, IC503, Q313 and/or VCO2 circuit: Replace the defective components.
Low sensitivity between 25.0000 and 520.0000 MHz.	1) Defective IC501 pin 69, IC503, Q301 and/or low-pass filter circuit: Replace the defective components.
Low sensitivity between 760.0000 and 1300.0000 MHz.	1) Defective IC501 pin 68, IC503, Q305 and/or high-pass filter circuit: Replace the defective components.
All bands do not operate but display is OK.	1) Defective PLL circuit IC301, IC302, IC303, IC304 and/or associated circuit: Replace the defective components. 2) Defective Q317, Q318 and/or associated circuit: Replace the defective components.
Searches but does not halt on the correct frequency.	1) Defective IC4: Replace. 2) Discriminator Coil T8 (AM and NFM modes) or T4 (WFM mode) is out of adjustment: TP2 shall have approx. 3.8 V in normal receiving AM and NFM modes. TP1 shall have approx. 3.9 V in normal receiving WFM mode.

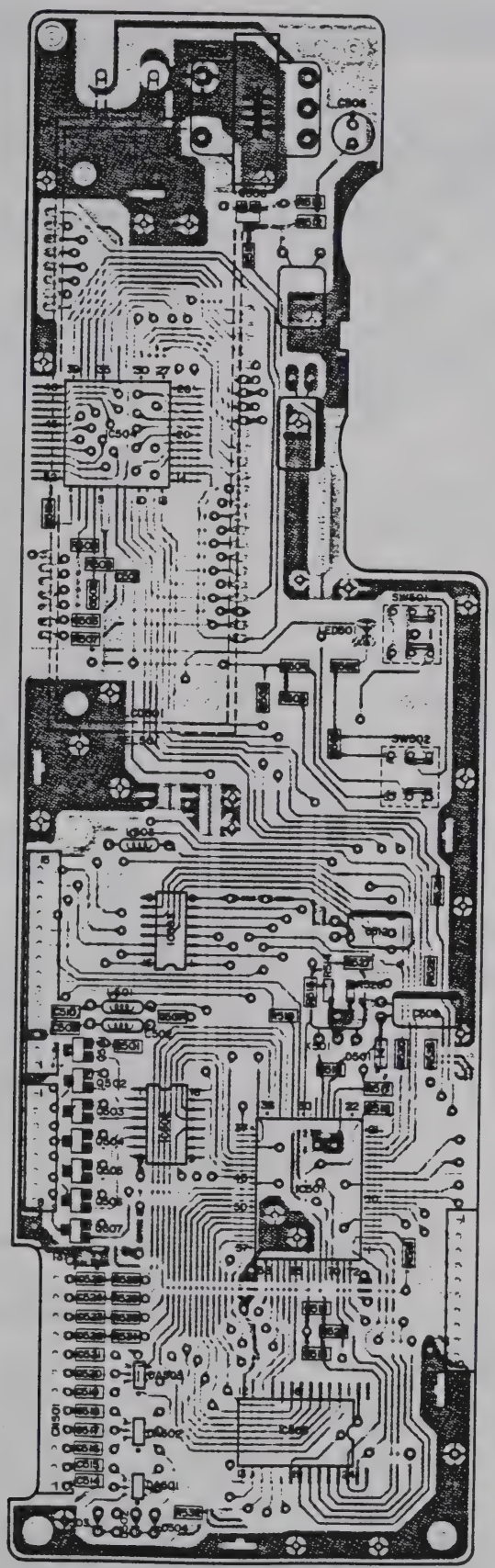
PLL PCB (Top View)



LINEAR PCB (Bottom View)

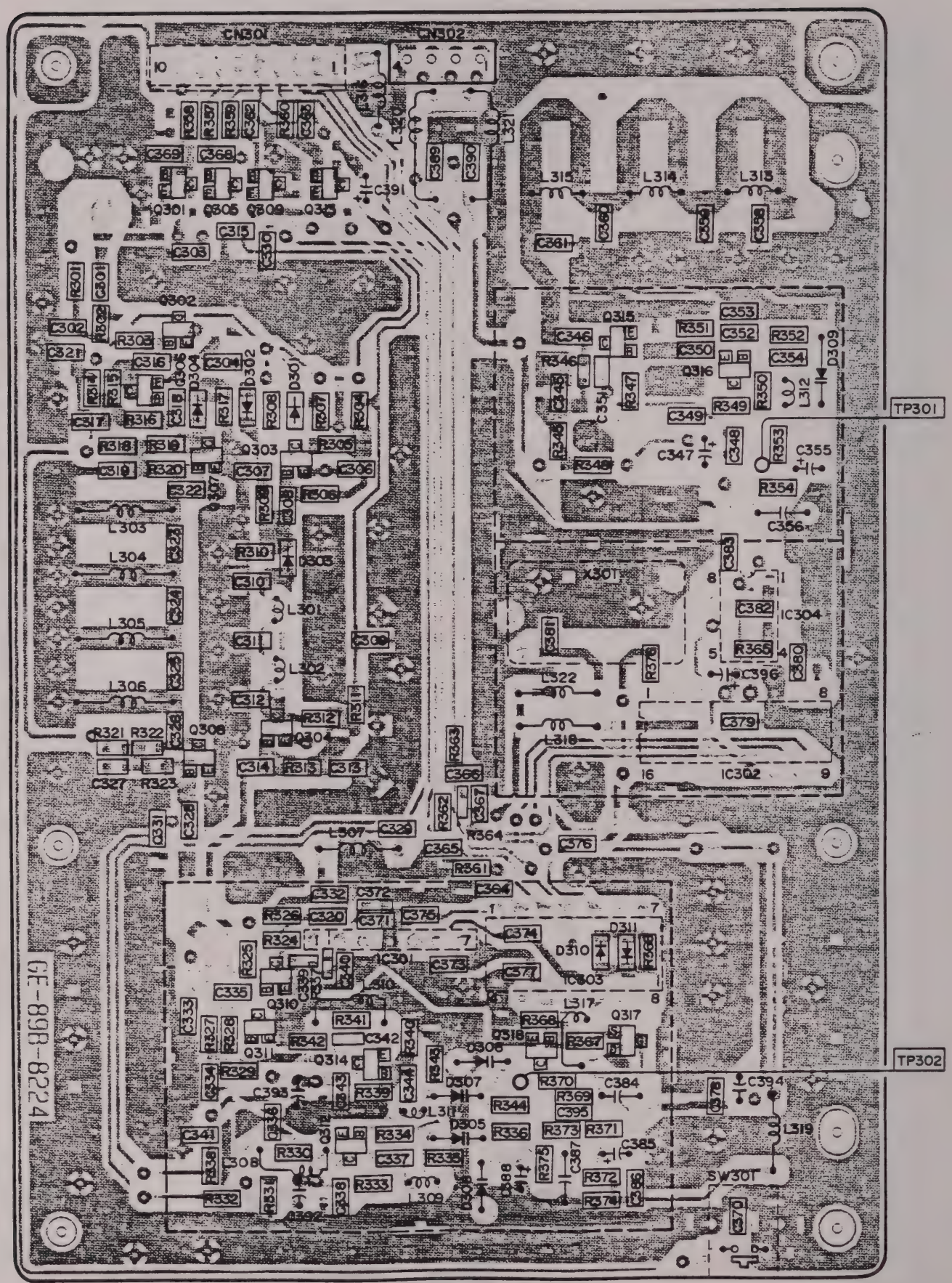


LOGIC & DISPLAY PCB (Top View)



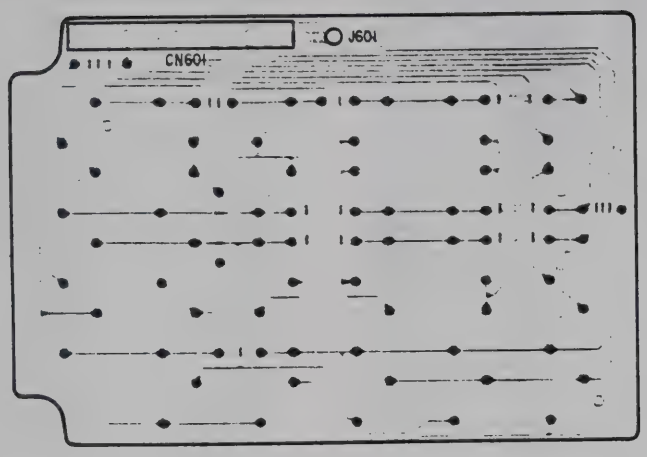
	D502	D504
U.S.A., CANADA MODELS	USE	NOT USE
AUSTRALIA, UK BELGIUM, FRANCE MODELS	NOT USE	USE

PLL PCB (Bottom View)

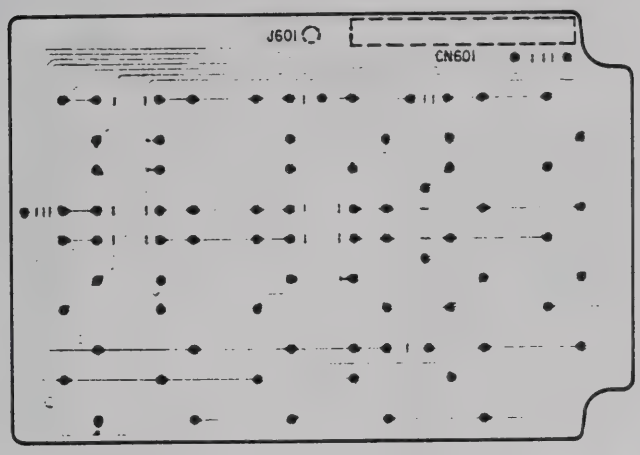


KEY BOARD PCB

(Top View)

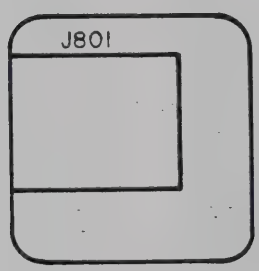


(Bottom View)

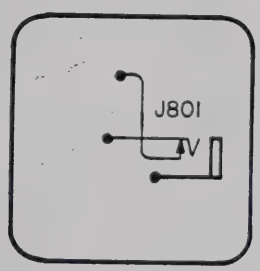


HEADPHONE JACK PCB

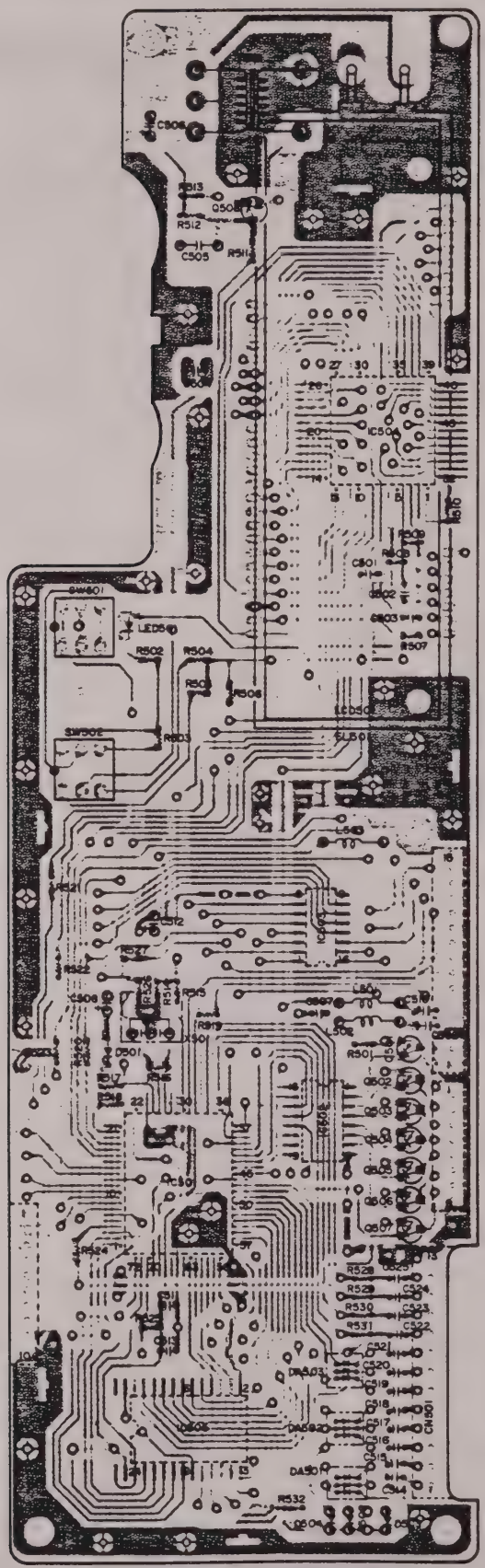
(Top view)



(Bottom View)



LOGIC & DISPLAY PCB (Bottom View)



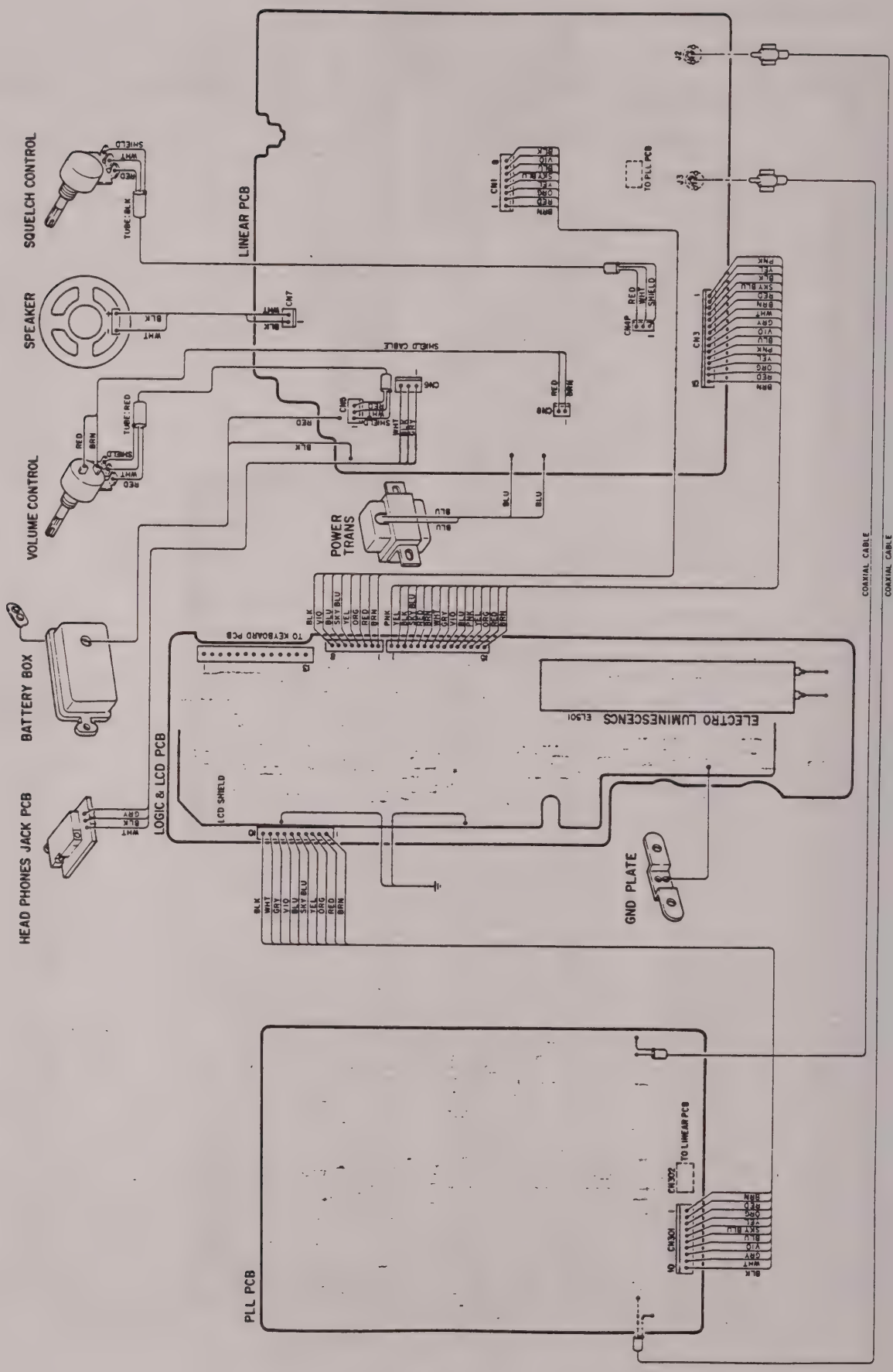
	D502	D504
U.S.A., CANADA MODELS	USE	NOT USE
AUSTRALIA, UK BELGIUM, FRANCE MODELS	NOT USE	USE

Electrical Parts List

Linear PCB Assembly

Ref. No.	Description				RS Part No.	MFR's Part No.
⑦	**PCB Assembly, Linear Board Consists of the following:**					**GA-89D-8300**
	Capacitors					
C1	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C2	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C3	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C4	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C5	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C6	Ceramic	0.5 pF	50 V	±0.25 pF		RMUMK212SL0R5C
C7	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C8	Ceramic	0.5 pF	50 V	±0.25 pF		RMUMK212SL0R5C
C9	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C10	Ceramic	0.5 pF	50 V	±0.25 pF		RMUMK212SL0R5C
C11	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C12	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C13	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C14	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C15	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C16	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C17	Electrolytic	33 μF	16 V	±20%		ECEA1CU330
C18	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C19	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C20	Ceramic	6 pF	50 V	±0.5 pF		RMUMK212SL060D
C21	Ceramic	6 pF	50 V	±0.5 pF		RMUMK212SL060D
C22	Ceramic	15 pF	50 V	±5%		RMUMK212SL150J
C23	Ceramic	7 pF	50 V	±0.5 pF		RMUMK212SL070D
C24	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C25	Ceramic	15 pF	50 V	±5%		RMUMK212SL150J
C26	Ceramic	15 pF	50 V	±5%		RMUMK212SL150J
C27	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C28	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C29	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C30	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C31	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C32	Ceramic	7 pF	50 V	±0.5 pF		RMUMK212SL070D
C33	Ceramic	7 pF	50 V	±0.5 pF		RMUMK212SL070D
C34	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C35	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C36	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C37	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C38	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C39	Ceramic	7 pF	50 V	±0.5 pF		RMUMK212SL070D
C40	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C41	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C42	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C43	Ceramic	27 pF	50 V	±5%		RMUMK212SL270J
C44	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C45	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J

WIRING DIAGRAM



Ref. No.	Description				RS Part No.	MFR's Part No.
C97	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C98	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C99	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C100	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C101	Ceramic	3 pF	50 V	±0.25 pF		RMUMK212SL030C
C102	Ceramic	3 pF	50 V	±0.25 pF		RMUMK212SL030C
C103	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C104	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C105	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C106	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C107	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C108	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C109	Ceramic	4 pF	50 V	±0.25 pF		RMUMK212SL040C
C110	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C111	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C112	Ceramic	33 pF	50 V	±5%		RMUMK212SL330J
C113	Ceramic	470 pF	50 V	±5%		RMUMK212SL471J
C114	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C115	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C116	Ceramic	4 pF	50 V	±0.25 pF		RMUMK212SL040C
C117	Ceramic	4 pF	50 V	±0.25 pF		RMUMK212SL040C
C118	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C119	Ceramic	4 pF	50 V	±0.25 pF		RMUMK212SL040C
C120	Ceramic	4 pF	50 V	±0.25 pF		RMUMK212SL040C
C121	Not used					
C122	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C123	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C124	Ceramic	18 pF	50 V	±5%		RMUMK212SL180J
C125	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C126	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C127	Not used					
C128	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C129	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C130	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C131	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C132	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C133	Ceramic	18 pF	50 V	±5%		RMUMK212SL180J
C134	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C135	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C136	Ceramic	56 pF	50 V	±5%		RMUMK212SL560J
C137	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C138	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C139	Ceramic	0.022 μF	50 V	±10%		RMUMK212B223K
C140	Mylar *	0.047 μF	50 V	±10%		AMZ-473K50
C141	Mylar	0.047 μF	50 V	±10%		AMZ-473K50
C142	Ceramic	0.022 μF	50 V	±10%		RMUMK212B223K
C143	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C144	Electrolytic	100 μF	16 V	±20%		ECEA1CU101
C145	Ceramic	0.022 μF	50 V	±10%		RMUMK212B223K
C146	Ceramic	0.047 μF	50 V	+80%–20%		RMUMK212F473Z

* Mylar is a registered trademark of E.I.Du pont de Nemours and Company.

Ref. No.	Description				RS Part No.	MFR's Part No.
C46	Ceramic	27 pF	50 V	±5%		RMUMK212SL270J
C47	Ceramic	33 pF	50 V	±5%		RMUMK212SL330J
C48	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C49	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C50	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C51	Ceramic	15 pF	50 V	±5%		RMUMK212SL150J
C52	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C53	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C54	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C55	Ceramic	56 pF	50 V	±5%		RMUMK212SL560J
C56	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C57	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C58	Ceramic	33 pF	50 V	±5%		RMUMK212SL330J
C59	Ceramic	33 pF	50 V	±5%		RMUMK212SL330J
C60	Ceramic	82 pF	50 V	±5%		RMUMK212SL820J
C61	Ceramic	82 pF	50 V	±5%		RMUMK212SL820J
C62	Ceramic	82 pF	50 V	±5%		RMUMK212SL820J
C63	Ceramic	33 pF	50 V	±5%		RMUMK212SL330J
C64	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C65	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C66	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C67	Ceramic	82 pF	50 V	±5%		RMUMK212SL820J
C68	Ceramic	33 pF	50 V	±5%		RMUMK212SL330J
C69	Ceramic	56 pF	50 V	±5%		RMUMK212SL560J
C70	Ceramic	68 pF	50 V	±5%		RMUMK212SL680J
C71	Ceramic	150 pF	50 V	±5%		RMUMK212SL151J
C72	Ceramic	150 pF	50 V	±5%		RMUMK212SL151J
C73	Ceramic	150 pF	50 V	±5%		RMUMK212SL151J
C74	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C75	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C76	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C77	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C78	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C79	Ceramic	68 pF	50 V	±5%		RMUMK212SL680J
C80	Ceramic	56 pF	50 V	±5%		RMUMK212SL560J
C81	Ceramic	150 pF	50 V	±5%		RMUMK212SL151J
C82	Ceramic	180 pF	50 V	±5%		RMUMK212SL181J
C83	Ceramic	150 pF	50 V	±5%		RMUMK212SL151J
C84	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C85	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C86	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C87	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C88	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C89	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C90	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C91	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C92	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C93	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C94	Electrolytic	33 μF	16 V	±20%		ECEA1CU330
C95	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C96	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D

Ref. No.	Description				RS Part No.	MFR's Part No.
C197	Mylar	0.056 μF	50 V	±10%		AMZ-563K50
C198	Electrolytic	0.1 μF	50 V	±20%		ECEA1HU0R1
C199	Mylar	0.056 μF	50 V	±10%		AMZ-563K50
C200	Electrolytic	4.7 μF	50 V	±20%		ECEA1HU4R7
C201	Tantalum	0.1 μF	35 V	±10%		TSD-S-1V0R1K
C202	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C203	Ceramic	330 pF	50 V	±5%		RMUMK212SL331J
C204	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C205	Mylar	0.082 μF	50 V	±10%		AMZ-823K50
C206	Mylar	0.047 μF	50 V	±10%		AMZ-473K50
C207	Mylar	0.056 μF	50 V	±10%		AMZ-563K50
C208	Mylar	0.0047 μF	50 V	±10%		AMZ-472K50
C209	Electrolytic	2.2 μF	50 V	±20%		ECEA1HU2R2
C210	Ceramic	0.0015 μF	50 V	±10%		RMUMK212B152K
C211	Mylar	0.0068 μF	50 V	±10%		AMZ-682K50
C212	Mylar	0.0068 μF	50 V	±10%		AMZ-682K50
C213	Mylar	0.047 μF	50 V	±10%		AMZ-473K50
C214	Electrolytic	4.7 μF	50 V	±20%		ECEA1HU4R7
C215	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C216	Electrolytic	47 μF	16 V	±20%		ECEA1CU470
C217	Mylar	0.001 μF	50 V	±10%		AMZ-102K50
C218	Electrolytic	100 μF	16 V	±20%		ECEA1CU101
C219	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C220	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C221	Electrolytic	2.2 μF	50 V	±20%		ECEA1HU2R2
C222	Electrolytic	1000 μF	25 V	±20%		ECEA1EU102
C223	Electrolytic	47 μF	16 V	±20%		ECEA1CU470
C224	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C225	Ceramic	0.1 μF	50 V	+80%–20%		PRE131F104Z or SR295F104Z
C226	Electrolytic	100 μF	16 V	±20%		ECEA1CU101
C227	Tantalum	0.1 μF	35 V	±10%		TSD-S-1V0R1K
C228	Tantalum	0.33 μF	35 V	±10%		TSD-S-1VR33K
⚠C229	Electrolytic	2200 μF	25 V	±20%		ECEA1EU222
C230	Electrolytic	220 μF	16 V	±20%		ECEA1CU221
C231	Mylar	0.033 μF	50 V	±10%		AMZ-333K50
C232	Electrolytic	220 μF	16 V	±20%		ECEA1CU221
C233	Electrolytic	100 μF	16 V	±20%		ECEA1CU101
C234	Electrolytic	0.1 μF	50 V	±20%		ECEA1HU0R1
C235	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C236	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C237	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C238	Electrolytic	470 μF	25 V	±20%		ECEA1EU471
C239	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C240	Ceramic	68 pF	50 V	±5%		RMUMK212SL680J
C241	Ceramic	3 pF	50 V	±0.25 pF		RMUMK212SL030C
C242	Ceramic	33 pF	50 V	±5%		RMUMK212SL330J
C243	Mylar	0.0082 μF	50 V	±10%		AMZ-822K50
C244	Electrolytic	10 μF	16 V	±20%		ECEA1CU100

Ref. No.	Description				RS Part No.	MFR's Part No.
C147	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C148	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C149	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C150	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C151	Mylar	0.0022 μF	50 V	±10%		AMZ-222K50
C152	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C153	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C154	Mylar	0.01 μF	50 V	±10%		AMZ-103K50
C155	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C156	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C157	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C158	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C159	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C160	Mylar	0.056 μF	50 V	±10%		AMZ-563K50
C161	Electrolytic	22 μF	16 V	±20%		ECEA1CU220
C162	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C163	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C164	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C165	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C166	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C167	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C168	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C169	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C170	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C171	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C172	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C173	Ceramic	18 pF	50 V	±5%		RMUMK212SL180J
C174	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C175	Ceramic	33 pF	50 V	±5%		RMUMK212SL330J
C176	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C177	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C178	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C179	Tantalum	0.47 μF	35 V	±10%		TSD-S-1VR47K
C180	Tantalum	0.47 μF	35 V	±10%		TSD-S-1VR47K
C181	Ceramic	0.047 μF	50 V	+80%–20%		RMUMK212F473Z
C182	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C183	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C184	Electrolytic	220 μF	16 V	±20%		ECEA1CU221
C185	Tantalum	0.22 μF	35 V	±10%		TSD-S-1VR22K
C186	Mylar	0.01 μF	50 V	±10%		AMZ-103K50
C187	Ceramic	8 pF	50 V	±0.5 pF		RMUMK212SL080D
C188	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C189	Ceramic	470 pF	50 V	±5%		RMUMK212SL471J
C190	Ceramic	470 pF	50 V	±5%		RMUMK212SL471J
C191	Tantalum	0.1 μF	35 V	±10%		TSD-S-1V0R1K
C192	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C193	Mylar	0.047 μF	50 V	±10%		AMZ-473K50
C194	Electrolytic	0.1 μF	50 V	±20%		ECEA1HU0R1
C195	Electrolytic	1 μF	50 V	±20%		ECEA1HU010
C196	Mylar	0.022 μF	50 V	±10%		AMZ-223K50

Ref. No.	Description			RS Part No.	MFR's Part No.
D29		HSR277	(Silicon)		HSR277
D30	Quad.	ND487C1-3R	(Silicon)		ND487C1-3R
D31		HSR277	(Silicon)		HSR277
D32		HSR277	(Silicon)		HSR277
D33		1K261 or OA90-R	(Germanium)		1K261 or OA90-R
D34		1K261 or OA90-R	(Germanium)		1K261 or OA90-R
D35		1K261 or OA90-R	(Germanium)		1K261 or OA90-R
D36		1S2076A	(Silicon)		1S2076A
D37		1S2076A	(Silicon)		1S2076A
D38		1S2076A	(Silicon)		1S2076A
D39		1S2076A	(Silicon)		1S2076A
D40		1S2076A	(Silicon)		1S2076A
D41		1S2076A	(Silicon)		1S2076A
D42		1S2076A	(Silicon)		1S2076A
D43		1S2076A	(Silicon)		1S2076A
D44		1S2076A	(Silicon)		1S2076A
D45		1S2076A	(Silicon)		1S2076A
D46		1S2076A	(Silicon)		1S2076A
D47		1S2076A	(Silicon)		1S2076A
D48		1S2076A	(Silicon)		1S2076A
D49		1S2076A	(Silicon)		1S2076A
D50		1S2076A	(Silicon)		1S2076A
D51		1SS81	(Silicon)		1SS81
D52	Not used				
D53	Zener	HZ33E B1 or B2	(Silicon)		HZ33E B1 or B2
D54	Zener	HZ9B2L	(Silicon)		HZ9B2L
D55	Zener	HZ6B2L	(Silicon)		HZ6B2L
D56		1S2076A	(Silicon)		1S2076A
D57	Zener	HZ11B2L	(Silicon)		HZ11B2L
D58		1N4002	(Silicon)		1N4002
D59		1S2076A	(Silicon)		1S2076A
D60	Rectifier	RC202	(Silicon)		RC202
	ICs				
IC1	KA2243 or HA12413	(IF Amp./Det.)	(Bipolar)		KA2243 or HA12413
IC2	TK10420	(IF Amp./Noise Amp./Det.)	(Bipolar)		TK10420
IC3	μPD4011BC or HD14011BP	(Switching)	(C-MOS)		μPD4011BC or HD14011BP
IC4	μPC324C	(Zeromatic)	(Bipolar)		μPC324C
IC5	μPC324C	(Low-BATT Det.)	(Bipolar)		μPC324C
IC6	μPD4066BC or HD14066BP	(Switching)	(C-MOS)		μPD4066BC or HD14066BP
IC7	TDA1905	(AF Power Amp.)	(Bipolar)		TDA1905
IC8	MC7805C or TA78005AP	(Voltage Regulator)	(Bipolar)		MC7805C or TA78005AP
IC9	S-81250HG	(Voltage Regulator)	(C-MOS)		S-81250HG
IC10	TC4S66F	(Switching)	(L-MOS)		TC4S66F

Ref. No.	Description				RS Part No.	MFR's Part No.
C245	Ceramic	220 pF	50 V	±5%		RMUMK212SL221J
C246	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
	Capacitor Arrays					
⚠CB1		0.01 μF x 2	250 V	+80%–20%		EXR-FS203ZS
CB2		0.01 μF x 2	250 V	+80%–20%		EXR-FS203ZS
	Ceramic Filters					
CF1		Ceramic	10.7 MHz			SFE10.7MA5W-A
CF2		Ceramic	10.7 MHz			SFE10.7MA5W-A
CF3		Ceramic	455 kHz			KBF-455M-6A
CF4		Ceramic	455 kHz			KBF-455R-15A
	Diodes					
D1		1S1585		(Silicon)		1S1585
D2		1S1585		(Silicon)		1S1585
D3		HSR277		(Silicon)		HSR277
D4		HSR277		(Silicon)		HSR277
D5		HSR277		(Silicon)		HSR277
D6		HSR277		(Silicon)		HSR277
D7		HSR277		(Silicon)		HSR277
D8		HSR277		(Silicon)		HSR277
D9		HSR277		(Silicon)		HSR277
D10		HSR277		(Silicon)		HSR277
D11		HSR277		(Silicon)		HSR277
D12		HSR277		(Silicon)		HSR277
D13		HSR277		(Silicon)		HSR277
D14		HSR277		(Silicon)		HSR277
D15		HSR277		(Silicon)		HSR277
D16		HSR277		(Silicon)		HSR277
D17		HSR277		(Silicon)		HSR277
D18		HSR277		(Silicon)		HSR277
D19		HSR277		(Silicon)		HSR277
D20		HSR277		(Silicon)		HSR277
D21		HSR277		(Silicon)		HSR277
D22		HSR277		(Silicon)		HSR277
D23		HSR277		(Silicon)		HSR277
D24		HSR277		(Silicon)		HSR277
D25		HSR277		(Silicon)		HSR277
D26		HSR277		(Silicon)		HSR277
D27		HSR277		(Silicon)		HSR277
D28		HSR277		(Silicon)		HSR277

Ref. No.	Description	RS Part No.	MFR's Part No.
L50	Coil, Choke		2LNO-255
L51	Coil, Choke		2LNO-256
L52	Coil, IF (1st)		HF-62H14 or R12-H756X
L53	Coil, Trap 512.5 MHz		2LNO-254
L54	Coil, Trap 512.5 MHz		2LNO-254
L55	Coil, Choke 0.68 μH		LAL03NAR68M
L56	Coil, Choke 2.2 mH		FL5HS222J
L57	Coil, Choke 1 μH		LAL03NA1R0M
L58	Coil, Choke		3B-037T
	Transistors		
Q1	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q2	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q3	2SC3356 (Marked R22) NPN		2SC3356
Q4	2SC3356 (Marked R22) NPN		2SC3356
Q5	2SC3356 (Marked R22) NPN		2SC3356
Q6	2SC3356 (Marked R22) NPN		2SC3356
Q7	2SC3356 (Marked R22) NPN		2SC3356
Q8	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q9	2SC2714(Y) (Marked QY) NPN		2SC2714(Y)
Q10	2SC2714(Y) (Marked QY) NPN		2SC2714(Y)
Q11	FET 2SK210(GR) (Marked YG) MOS		2SK210(GR)
Q12	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q13	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q14	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q15	2SC2714(Y) (Marked QY) NPN		2SC2714(Y)
Q16	2SC2714(Y) (Marked QY) NPN		2SC2714(Y)
Q17	2SA1162(GR) or (Y) (Marked SG,SY) PNP		2SA1162(GR) or (Y)
Q18	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q19	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q20	RN1408 (Marked XI) NPN		RN1408
Q21	RN1408 (Marked XI) NPN		RN1408
Q22	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q23	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q24	2SC3243 NPN		2SC3243
Q25	2SC2603 (F) NPN		2SC2603(F)
Q26	RN2405 (Marked YE) PNP		RN2405
Q27	RN2405 (Marked YE) PNP		RN2405
Q28	RN2405 (Marked YE) PNP		RN2405
Q29	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q30	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q31	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)
Q32	2SD1406(GR) NPN		2SD1406(GR)
Q33	2SC2458(GR) NPN		2SC2458(GR)
Q34	2SC2712(GR) or (Y) (Marked LG,LY) NPN		2SC2712(GR) or (Y)

Ref. No.	Description	RS Part No.	MFR's Part No.
	Coils		
L1	Coil, Choke 1 μH		LAL03NA1R0M
L2	Coil, Trap (609.5 MHz)		GR-H761
L3	Stripline on PCB		
L4	Stripline on PCB		
L5	Stripline on PCB		
L6	Stripline on PCB		
L7	Coil, B.P.F. (280 MHz to 520 MHz)		2LNB-253
L8	Coil, B.P.F. (280 MHz to 520 MHz)		2LNB-253
L9	Coil, B.P.F. (280 MHz to 520 MHz)		2LNB-253
L10	Coil, B.P.F. (280 MHz to 520 MHz)		2LNB-253
L11	Coil, B.P.F. (280 MHz to 520 MHz)		2LNB-253
L12	Coil, B.P.F. (280 MHz to 520 MHz)		2LNB-253
L13	Coil, B.P.F. (280 MHz to 520 MHz)		2LNB-253
L14	Coil, B.P.F. (174 MHz to 279.995 MHz)		2LNB-252
L15	Coil, B.P.F. (174 MHz to 279.995 MHz)		2LNB-252
L16	Coil, B.P.F. (174 MHz to 279.995 MHz)		2LNB-252
L17	Coil, B.P.F. (174 MHz to 279.995 MHz)		2LNB-252
L18	Coil, B.P.F. (174 MHz to 279.995 MHz)		2LNB-252
L19	Coil, B.P.F. (174 MHz to 279.995 MHz)		2LNB-252
L20	Coil, B.P.F. (174 MHz to 279.995 MHz)		2LNB-252
L21	Coil, B.P.F. (108 MHz to 173.995 MHz)		3LNB-251
L22	Coil, B.P.F. (108 MHz to 173.995 MHz)		3LNB-251
L23	Coil, B.P.F. (108 MHz to 173.995 MHz)		3LNB-251
L24	Coil, B.P.F. (108 MHz to 173.995 MHz)		3LNB-251
L25	Coil, B.P.F. (108 MHz to 173.995 MHz)		3LNB-251
L26	Coil, B.P.F. (108 MHz to 173.995 MHz)		3LNB-251
L27	Coil, B.P.F. (108 MHz to 173.995 MHz)		3LNB-251
L28	Coil, B.P.F. (68 MHz to 107.995 MHz)		4LNB-250
L29	Coil, B.P.F. (68 MHz to 107.995 MHz)		4LNB-250
L30	Coil, B.P.F. (68 MHz to 107.995 MHz)		4LNB-250
L31	Coil, B.P.F. (68 MHz to 107.995 MHz)		4LNB-250
L32	Coil, B.P.F. (68 MHz to 107.995 MHz)		4LNB-250
L33	Coil, B.P.F. (68 MHz to 107.995 MHz)		4LNB-250
L34	Coil, B.P.F. (68 MHz to 107.995 MHz)		4LNB-250
L35	Coil, B.P.F. (40 MHz to 67.995 MHz)		4LNB-249
L36	Coil, B.P.F. (40 MHz to 67.995 MHz)		4LNB-249
L37	Coil, B.P.F. (40 MHz to 67.995 MHz)		4LNB-249
L38	Coil, B.P.F. (40 MHz to 67.995 MHz)		4LNB-249
L39	Coil, B.P.F. (40 MHz to 67.995 MHz)		4LNB-249
L40	Coil, B.P.F. (40 MHz to 67.995 MHz)		4LNB-249
L41	Coil, B.P.F. (25 MHz to 39.995 MHz)		LAL03NAR33M
L42	Coil, B.P.F. (25 MHz to 39.995 MHz)		LAL03NAR33M
L43	Coil, B.P.F. (25 MHz to 39.995 MHz)		LAL03NAR33M
L44	Coil, B.P.F. (25 MHz to 39.995 MHz)		LAL03NAR33M
L45	Coil, B.P.F. (25 MHz to 39.995 MHz)		LAL03NAR33M
L46	Coil, B.P.F. (25 MHz to 39.995 MHz)		LAL03NAR33M
L47	Coil, Choke 10 μH		LAL03NA100K
L48	Coil, DBM		2LNM-258
L49	Coil, DBM		2LNM-258

Ref. No.	Description	RS Part No.	MFR's Part No.
R50	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R51	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R52	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R53	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R54	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R55	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R56	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R57	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R58	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R59	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R60	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R61	Metal Glaze 3.3 kohm 1/10 W ±5%		RCM332J55
R62	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R63	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R64	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R65	Metal Glaze 270 ohm 1/10 W ±5%		RCM271J55
R66	Metal Glaze 2.2 kohm 1/10 W ±5%		RCM222J55
R67	Metal Glaze 470 ohm 1/10 W ±5%		RCM471J55
R68	Metal Glaze 22 ohm 1/10 W ±5%		RCM220J55
R69	Metal Glaze 820 ohm 1/10 W ±5%		RCM821J55
R70	Metal Glaze 1.5 kohm 1/10 W ±5%		RCM152J55
R71	Metal Glaze 330 ohm 1/10 W ±5%		RCM331J55
R72	Metal Glaze 56 ohm 1/10 W ±5%		RCM560J55
R73	Metal Glaze 680 ohm 1/10 W ±5%		RCM681J55
R74	Metal Glaze 1.5 kohm 1/10 W ±5%		RCM152J55
R75	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R76	Metal Glaze 47 ohm 1/10 W ±5%		RCM470J55
R77	Metal Glaze 1.5 kohm 1/10 W ±5%		RCM152J55
R78	Metal Glaze 2.2 kohm 1/10 W ±5%		RCM222J55
R79	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R80	Metal Glaze 330 ohm 1/10 W ±5%		RCM331J55
R81	Metal Glaze 56 ohm 1/10 W ±5%		RCM560J55
R82	Not used		
R83	Not used		
R84	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R85	Metal Glaze 220 kohm 1/10 W ±5%		RCM224J55
R86	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R87	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R88	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R89	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R90	Metal Glaze 120 kohm 1/10 W ±5%		RCM124J55
R91	Metal Glaze 15 kohm 1/10W ±5%		RCM153J55
R92	Metal Glaze 180 kohm 1/10 W ±5%		RCM184J55
R93	Metal Glaze 27 kohm 1/10 W ±5%		RCM273J55
R94	Metal Glaze 56 kohm 1/10 W ±5%		RCM563J55
R95	Metal Glaze 5.6 kohm 1/10 W ±5%		RCM562J55
R96	Metal Glaze 220 kohm 1/10 W ±5%		RCM224J55
R97	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R98	Metal Glaze 2.2 kohm 1/10 W ±5%		RCM222J55
R99	Metal Glaze 220 kohm 1/10 W ±5%		RCM224J55

Ref. No.	Description	RS Part No.	MFR's Part No.
	Resistors		
R1	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R2	Metal Glaze 82 ohm 1/10 W ±5%		RCM820J55
R3	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R4	Metal Glaze 3.3 kohm 1/10 W ±5%		RCM332J55
R5	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R6	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R7	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R8	Metal Glaze 3.3 kohm 1/10 W ±5%		RCM332J55
R9	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R10	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R11	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R12	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R13	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R14	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R15	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R16	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R17	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R18	Not used		
R19	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R20	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R21	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R22	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R23	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R24	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R25	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R26	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R27	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R28	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R29	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R30	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R31	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R32	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R33	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R34	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R35	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R36	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R37	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R38	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R39	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R40	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R41	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R42	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R43	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R44	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R45	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R46	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R47	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R48	Metal Glaze 470 kohm 1/10 W ±5%		RCM474J55
R49	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55

Ref. No.	Description	RS Part No.	MFR's Part No.
R150	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R151	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R152	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R153	Metal Glaze 2.2 kohm 1/10 W ±5%		RCM222J55
R154	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R155	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R156	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R157	Metal Glaze 1 Mohm 1/10 W ±5%		RCM105J55
R158	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R159	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R160	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R161	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R162	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R163	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R164	Metal Glaze 8.2 kohm 1/10 W ±5%		RCM822J55
R165	Metal Glaze 1.5 kohm 1/10 W ±5%		RCM152J55
R166	Metal Glaze 2.7 kohm 1/10 W ±5%		RCM272J55
R167	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R168	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R169	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R170	Metal Glaze 3.3 kohm 1/10 W ±5%		RCM332J55
R171	Metal Glaze 2.7 kohm 1/10 W ±5%		RCM272J55
R172	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R173	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R174	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R175	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R176	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R177	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R178	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R179	Metal Glaze 5.6 kohm 1/10 W ±5%		RCM562J55
R180	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R181	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R182	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R183	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R184	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R185	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R186	Metal Glaze 1 Mohm 1/10 W ±5%		RCM105J55
R187	Metal Glaze 1.2 kohm 1/10 W ±5%		RCM122J55
R188	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R189	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R190	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R191	Metal Glaze 220 kohm 1/10 W ±5%		RCM224J55
R192	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R193	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R194	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R195	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R196	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R197	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R198	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R199	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55

Ref. No.	Description	RS Part No.	MFR's Part No.
R100	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R101	Metal Glaze 2.2 kohm 1/10 W ±5%		RCM222J55
R102	Metal Glaze 6.8 kohm 1/10 W ±5%		RCM682J55
R103	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R104	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R105	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R106	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R107	Metal Glaze 150 ohm 1/10 W ±5%		RCM151J55
R108	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R109	Metal Glaze 10 ohm 1/10 W ±5%		RCM100J55
R110	Metal Glaze 39 kohm 1/10 W ±5%		RCM393J55
R111	Metal Glaze 8.2 kohm 1/10 W ±5%		RCM822J55
R112	Metal Glaze 8.2 kohm 1/10 W ±5%		RCM822J55
R113	Metal Glaze 1 Mohm 1/10 W ±5%		RCM105J55
R114	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R115	Metal Glaze 22 kohm 1/10 W ±5%		RCM223J55
R116	Metal Glaze 470 ohm 1/10 W ±5%		RCM471J55
R117	Metal Glaze 1.5 kohm 1/10 W ±5%		RCM152J55
R118	Metal Glaze 270 kohm 1/10 W ±5%		RCM274J55
R119	Metal Glaze 15 kohm 1/10 W ±5%		RCM153J55
R120	Metal Glaze 470 ohm 1/10 W ±5%		RCM471J55
R121	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R122	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R123	Metal Glaze 180 kohm 1/10 W ±5%		RCM184J55
R124	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R125	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R126	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R127	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R128	Metal Glaze 4.7 kohm 1/10 W ±5%		RCM472J55
R129	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R130	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R131	Metal Glaze 390 kohm 1/10 W ±5%		RCM394J55
R132	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R133	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R134	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R135	Metal Glaze 390 kohm 1/10 W ±5%		RCM394J55
R136	Metal Glaze 3.3 kohm 1/10 W ±5%		RCM332J55
R137	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R138	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R139	Metal Glaze 470 ohm 1/10 W ±5%		RCM471J55
R140	Metal Glaze 390 kohm 1/10 W ±5%		RCM394J55
R141	Metal Glaze 5.6 kohm 1/10 W ±5%		RCM562J55
R142	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R143	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R144	Metal Glaze 47 ohm 1/10 W ±5%		RCM470J55
R145	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R146	Metal Glaze 1.5 kohm 1/10 W ±5%		RCM152J55
R147	Metal Glaze 3.3 kohm 1/10 W ±5%		RCM332J55
R148	Metal Glaze 1.5 kohm 1/10 W ±5%		RCM152J55
R149	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55

Ref. No.	Description	RS Part No.	MFR's Part No.
R250	Metal Glaze 470 ohm 1/10 W ±5%		RCM471J55
R251	Metal Glaze 15 kohm 1/10 W ±5%		RCM153J55
R252	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55
R253	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R254	Metal Glaze 22 kohm 1/10 W ±5%		RCM223J55
R255	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R256	Metal Glaze 10 ohm 1/10 W ±5%		RCM100J55
	Transformers		
T1	Coil, IF (2nd)		7SSI-298
T2	Coil, IF (2nd)		7SSI-298
T3	Coil, IF (3rd)		GR-A470033
T4	Coil, Quadrature/Det. (WFM Band) 10.7MHz		GR-A793
T5	Coil, IF (3rd) (AM Band)		5SSI-292
T6	Coil, IF (3rd) (AM Band)		5SSI-293
T7	Coil, IF (2nd)		7SSI-298
T8	Coil, Quadrature/Det. (NFM Band)		GR-P792
T9	Coil, DC–DC Converter		10SSO-297
	Thermistor		
TH1	Thermistor 1.7 kohm		TD5-C217D2
	Crystals		
X1	37.8 MHz TC-43 Type		37.8 MHz
X2	48.045 MHz TC-43 Type		48.045 MHz
	Crystal Filter		
XF1	Filter Crystal 48.5 MHz		MR48R48.5 MHz
	Miscellaneous		
CN1	Connector 8 Pin Male		PI22A08M
CN2	Connector 4 Pin Female		5224-04CHPB
CN3	Connector 15 Pin Male		PI22A15M
CN4	Connector 3 Pin Male		PI22A03M
CN5	Connector 3 Pin Male		PI22A03M
CN6	Connector 3 Pin Male		PI22A03M
CN7	Connector 2 Pin Male		PI22A02M
CN8	Connector 2 Pin Male		PI22A02M

Ref. No.	Description				RS Part No.	MFR's Part No.
R200	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R201	Metal Glaze	22 kohm	1/10 W	±5%		RCM223J55
R202	Metal Glaze	15 kohm	1/10 W	±5%		RCM153J55
R203	Metal Glaze	33 kohm	1/10 W	±5%		RCM333J55
R204	Metal Glaze	100 kohm	1/10 W	±5%		RCM104J55
R205	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R206	Metal Glaze	22 kohm	1/10 W	±5%		RCM223J55
R207	Metal Glaze	47 kohm	1/10 W	±5%		RCM473J55
R208	Metal Glaze	82 kohm	1/10 W	±5%		RCM823J55
R209	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R210	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R211	Metal Glaze	1 Mohm	1/10 W	±5%		RCM105J55
R212	Metal Glaze	2.7 kohm	1/10 W	±5%		RCM272J55
R213	Metal Glaze	470 ohm	1/10 W	±5%		RCM471J55
R214	Metal Glaze	4.7 kohm	1/10 W	±5%		RCM472J55
R215	Metal Glaze	47 ohm	1/10 W	±5%		RCM470J55
R216	Metal Glaze	150 ohm	1/10 W	±5%		RCM151J55
R217	Carbon Film	1 kohm	1/6 W	±5%		ERD16EJ102
R218	Carbon Film	1 kohm	1/6 W	±5%		ERD16EJ102
R219	Metal Glaze	10 ohm	1/10 W	±5%		RCM100J55
R220	Metal Glaze	22 kohm	1/10 W	±5%		RCM223J55
R221	Metal Glaze	100 kohm	1/10 W	±5%		RCM104J55
R222	Metal Glaze	1 Mohm	1/10 W	±5%		RCM105J55
R223	Metal Glaze	1 kohm	1/10 W	±5%		RCM102J55
R224	Metal Film	3.3 ohm	1/2 W	±5%		RNF1/2S3.3ohmJ
R225	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R226	Metal Glaze	2.2 ohm	1/10 W	±5%		RCM2R2J55
R227	Metal Glaze	47 ohm	1/10 W	±5%		RCM470J55
R228	Metal Glaze	270 ohm	1/10 W	±5%		RCM271J55
R229	Metal Film	2.2 ohm	1 W	±5%		ERQ-1AJ-2R2
R230	Metal Glaze	56 kohm	1/10 W	±5%		RCM563J55
R231	Metal Glaze	33 kohm	1/10 W	±5%		RCM333J55
R232	Metal Glaze	2.2 Mohm	1/10 W	±5%		RCM225J55
R233	Metal Glaze	180 kohm	1/10 W	±5%		RCM184J55
R234	Metal Glaze	470 kohm	1/10 W	±5%		RCM474J55
R235	Metal Glaze	2.2 Mohm	1/10 W	±5%		RCM225J55
R236	Metal Glaze	100 kohm	1/10 W	±5%		RCM104J55
R237	Metal Glaze	15 kohm	1/10 W	±5%		RCM153J55
R238	Metal Glaze	33 kohm	1/10 W	±5%		RCM333J55
R239	Metal Glaze	4.7 kohm	1/10 W	±5%		RCM472J55
R240	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R241	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R242	Metal Glaze	220 kohm	1/10 W	±5%		RCM224J55
R243	Carbon Film	330 ohm	1/6 W	±5%		ERD16EJ331
R244	Carbon Film	220 ohm	1/6 W	±5%		ERD16EJ221
R245	Metal Glaze	15 kohm	1/10 W	±5%		RCM153J55
R246	Metal Glaze	33 kohm	1/10 W	±5%		RCM333J55
R247	Metal Glaze	10 ohm	1/10 W	±5%		RCM100J55
R248	Metal Glaze	5.6 kohm	1/10 W	±5%		RCM562J55
R249	Metal Film	1 ohm	1/2 W	±5%		RNF1/2S1ohmJ

PLL PCB Assembly

Ref. No.	Description				RS Part No.	MFR's Part No.
⑧	**Assembly, PCB PLL** **Consists of the following:**					GA-89D-8301
	Capacitors					
C301	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C302	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C303	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C304	Ceramic	1 pF	50 V	±0.25 pF		RMUMK212SL010C
C305	Not used					
C306	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C307	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C308	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C309	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C310	Ceramic	3 pF	50 V	±0.25 pF		RMUMK212SL030C
C311	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C312	Ceramic	3 pF	50 V	±0.25 pF		RMUMK212SL030C
C313	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C314	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C315	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C316	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C317	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C318	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C319	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C320	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C321	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C322	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C323	Ceramic	1 pF	50 V	±0.25 pF		RMUMK212SL010C
C324	Ceramic	1 pF	50 V	±0.25 pF		RMUMK212SL010C
C325	Ceramic	1 pF	50 V	±0.25 pF		RMUMK212SL010C
C326	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C327	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C328	Ceramic	1 pF	50 V	±0.25 pF		RMUMK212SL010C
C329	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C330	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C331	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C332	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C333	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C334	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C335	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C336	Ceramic	1 pF	50 V	±0.25 pF		RMUMK212SL010C
C337	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C338	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C339	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C340	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C341	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C342	Ceramic	1 pF	50 V	±0.25 pF		RMUMK212SL010C
C343	Ceramic	22 pF	50 V	±5%		RMUMK212SL220J
C344	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C345	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C346	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C347	Electrolytic	220 μF	16 V	±20%		ECEA1CU221

Ref. No.	Description	RS Part No.	MFR's Part No.
J1 (46)	Jack Ant		GE-85D-5383
J2	Jack (PLL)		TMP-J01X-V6
J3	Jack (PLL)		TMP-J01X-V6
J4	Jack (Tape Out)		S-Q3097 #01
J5	Jack (Ext. Speaker)		S-G8036
J6	Jack (Power Jack)		MOJ-D14
SW1	Switch, Slide (ATT SW)		SSFZUB22-07
TP1	Pin Test		ERD-25TC0
TP2	Pin Test		ERD-25TC0
(47)	Bracket, Antenna Connector		GE-86D-6362
(48)	Shield, BPF (Case)		GE-79D-0178B
(49)	Shield, BPF (Top)		GE-88D-7570
(50)	Shield, BPF (Bottom)		GE-88D-7730
(51)	Shield, Case (C)		GE-86D-6376
(52)	Shield, Case (B)		GE-86D-6372
(53)	Shield, Top (B)		GE-88D-7571
(54)	Fiber, BPF Shield		GE-88D-7728
	Pipe, Tight		1 x 3 x 15 mm

Ref. No.	Description			RS Part No.	MFR's Part No.
	Diodes				
D301		HSR277	(Silicon)		HSR277
D302		HSR277	(Silicon)		HSR277
D303		HSR277	(Silicon)		HSR277
D304		HSR277	(Silicon)		HSR277
D305	Varactor	1T25 or 1T32	(Silicon)		1T25 or 1T32
D306	Varactor	1T25 or 1T32	(Silicon)		1T25 or 1T32
D307	Varactor	1T25 or 1T32	(Silicon)		1T25 or 1T32
D308	Varactor	1T25 or 1T32	(Silicon)		1T25 or 1T32
D309	Varactor	1SV89	(Silicon)		1SV89
D310		HSR277	(Silicon)		HSR277
D311		HSR277	(Silicon)		HSR277
	ICs				
IC301	TD6105AP	Pre-Scaler	(Bipolar)		TD6105AP
IC302	MC145158	PLL	(C-MOS)		MC145158
IC303	CX-7925B	PLL/Pre-Scaler	(N-MOS)		CX-7925B
IC304	MB501LP	Pre-Scaler	(C-MOS)		MB501LP
	Coils				
L301	Low-Pass Filter				2.5LNB-257
L302	Low-Pass Filter				2.5LNB-257
L303	Stripline on PCB				
L304	Stripline on PCB				
L305	Stripline on PCB				
L306	Stripline on PCB				
L307	Coil, Choke	10 μH			LAL03NA100K
L308	Coil, Choke	0.47 μH			LAL03NAR47M
L309	Coil, VCO				2LNO-254
L310	Coil, Choke	0.47 μH			LAL03NAR47M
L311	Coil, VCO				2LNO-255
L312	Coil, VOC				2LNB-253
L313	Stripline on PCB				
L314	Stripline on PCB				
L315	Stripline on PCB				
L316	Coil, Choke	10 μH			LAL03NA100K
L317	Coil, Choke	10 μH			LAL03NA100K
L318	Coil, Choke	10 μH			LAL03NA100K
L319	Coil, Choke	10 μH			LAL03NA100K
L320	Coil, Choke	10 μH			LAL04NA100K
L321	Coil, Choke	10 μH			LAL04NA100K
L322	Coil, Choke	10 μH			LAL03NA100K

Ref. No.	Description				RS Part No.	MFR's Part No.
C348	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C349	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C350	Ceramic	2 pF	50 V	±0.25 pF		RMUMK212SL020C
C351	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C352	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C353	Ceramic	6 pF	50 V	±0.5 pF		RMUMK212SL060D
C354	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C355	Tantalum	0.47 μF	35 V	±10%		TSD-A-1VR47K
C356	Mylar	0.047 μF	50 V	±10%		AMZ-473K50
C357	Not used					
C358	Ceramic	8 pF	50 V	±0.5 pF		RMUMK212SL080D
C359	Ceramic	12 pF	50 V	±5%		RMUMK212SL120J
C360	Ceramic	8 pF	50 V	±0.5 pF		RMUMK212SL080D
C361	Ceramic	4 pF	50 V	±0.25 pF		RMUMK212SL040C
C362	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C363	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C364	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C365	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C366	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C367	Ceramic	47 pF	50 V	±5%		RMUMK212SL470J
C368	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C369	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C370	Ceramic	0.1 μF	25 V	+80%–20%		RMTMK212F104Z
C371	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C372	Ceramic	10 pF	50 V	±0.5 pF		RMUMK212SL100D
C373	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C374	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C375	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C376	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C377	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C378	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C379	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C380	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C381	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C382	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C383	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C384	Mylar	0.01 μF	50 V	±10%		AMZ-103K50
C385	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C386	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C387	Mylar	0.047 μF	50 V	±10%		AMZ-473K50
C388	Tantalum	0.1 μF	35 V	±10%		TSD-A-1V0R1K
C389	Ceramic	5 pF	50 V	±0.25 pF		RMUMK212SL050C
C390	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C391	Electrolytic	220 μF	16 V	±20%		ECEA1CU221
C392	Electrolytic	0.47 μF	50 V	±20%		ECEA1HUR47
C393	Electrolytic	0.47 μF	50 V	±20%		ECEA1HUR47
C394	Electrolytic	3.3 μF	50 V	±20%		ECEA1HU3R3
C395	Ceramic	150 pF	50 V	±5%		RMUMK212SL151J
C396	Tantalum	0.47 μF	35 V	±10%		TSD-A-1VR47K

Ref. No.	Description				RS Part No.	MFR's Part No.
R327	Metal Glaze	220 ohm	1/10 W	±5%		RCM221J55
R328	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R329	Metal Glaze	47 kohm	1/10 W	±5%		RCM473J55
R330	Metal Glaze	1 kohm	1/10 W	±5%		RCM102J55
R331	Metal Glaze	470 ohm	1/10 W	±5%		RCM471J55
R332	Metal Glaze	220 ohm	1/10 W	±5%		RCM221J55
R333	Metal Glaze	2.7 kohm	1/10 W	±5%		RCM272J55
R334	Metal Glaze	2.2 kohm	1/10 W	±5%		RCM222J55
R335	Metal Glaze	100 kohm	1/10 W	±5%		RCM104J55
R336	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R337	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R338	Metal Glaze	220 ohm	1/10 W	±5%		RCM221J55
R339	Metal Glaze	2.7 kohm	1/10 W	±5%		RCM272J55
R340	Metal Glaze	2.2 kohm	1/10 W	±5%		RCM222J55
R341	Metal Glaze	1 kohm	1/10 W	±5%		RCM102J55
R342	Metal Glaze	470 ohm	1/10 W	±5%		RCM471J55
R343	Metal Glaze	100 kohm	1/10 W	±5%		RCM104J55
R344	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R345	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R346	Metal Glaze	470 ohm	1/10 W	±5%		RCM471J55
R347	Metal Glaze	150 kohm	1/10 W	±5%		RCM154J55
R348	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R349	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R350	Metal Glaze	15 kohm	1/10 W	±5%		RCM153J55
R351	Metal Glaze	470 ohm	1/10 W	±5%		RCM471J55
R352	Metal Glaze	4.7 kohm	1/10 W	±5%		RCM472J55
R353	Metal Glaze	3.3 kohm	1/10 W	±5%		RCM332J55
R354	Metal Glaze	4.7 kohm	1/10 W	±5%		RCM472J55
R355	Not used					
R356	Not used					
R357	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R358	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R359	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R360	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R361	Metal Glaze	8.2 kohm	1/10 W	±5%		RCM822J55
R362	Metal Glaze	8.2 kohm	1/10 W	±5%		RCM822J55
R363	Metal Glaze	8.2 kohm	1/10 W	±5%		RCM822J55
R364	Metal Glaze	8.2 kohm	1/10 W	±5%		RCM822J55
R365	Metal Glaze	2.2 kohm	1/10 W	±5%		RCM222J55
R366	Metal Glaze	18 kohm	1/10 W	±5%		RCM183J55
R367	Metal Glaze	2.2 kohm	1/10 W	±5%		RCM222J55
R368	Metal Glaze	820 ohm	1/10 W	±5%		RCM821J55
R369	Metal Glaze	39 kohm	1/10 W	±5%		RCM393J55
R370	Metal Glaze	100 ohm	1/10 W	±5%		RCM101J55
R371	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R372	Metal Glaze	1 kohm	1/10 W	±5%		RCM102J55
R373	Metal Glaze	1 kohm	1/10 W	±5%		RCM102J55
R374	Metal Glaze	33 kohm	1/10 W	±5%		RCM333J55
R375	Metal Glaze	1 kohm	1/10 W	±5%		RCM102J55
R376	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55

Ref. No.	Description	RS Part No.	MFR's Part No.
	Transistors		
Q301	RN2405 (Marked YE) PNP		RN2405
Q302	2SC3356 (Marked R22) NPN		2SC3356
Q303	2SC3356 (Marked R22) NPN		2SC3356
Q304	2SC3356 (Marked R22) NPN		2SC3356
Q305	RN2405 (Marked YE) PNP		RN2405
Q306	2SC3356 (Marked R22) NPN		2SC3356
Q307	2SC3356 (Marked R22) NPN		2SC3356
Q308	2SC3356 (Marked R22) NPN		2SC3356
Q309	RN2405 (Marked YE) PNP		RN2405
Q310	2SC3356 (Marked R22) NPN		2SC3356
Q311	2SC3356 (Marked R22) NPN		2SC3356
Q312	2SC3356 (Marked R22) NPN		2SC3356
Q313	RN2405 (Marked YE) PNP		RN2405
Q314	2SC3356 (Marked R22) NPN		2SC3356
Q315	2SC3356 (Marked R22) NPN		2SC3356
Q316	2SC3356 (Marked R22) NPN		2SC3356
Q317	FET 2SK209(GR) (Marked XG) N-Junction		2SK209(GR)
Q318	2SC2712(GR) (Marked LG) NPN		2SC2712(GR)
	Resistors		
R301	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R302	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R303	Metal Glaze 33 kohm 1/10 W ±5%		RCM333J55
R304	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R305	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R306	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R307	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R308	Metal Glaze 2.2 kohm 1/10 W ±5%		RCM222J55
R309	Metal Glaze 2.2 kohm 1/10 W ±5%		RCM222J55
R310	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R311	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R312	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R313	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R314	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R315	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R316	Metal Glaze 47 kohm 1/10 W ±5%		RCM473J55
R317	Metal Glaze 1 kohm 1/10 W ±5%		RCM102J55
R318	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R319	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R320	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R321	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55
R322	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R323	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R324	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R325	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R326	Metal Glaze 220 ohm 1/10 W ±5%		RCM221J55

Logic & Display PCB Assembly

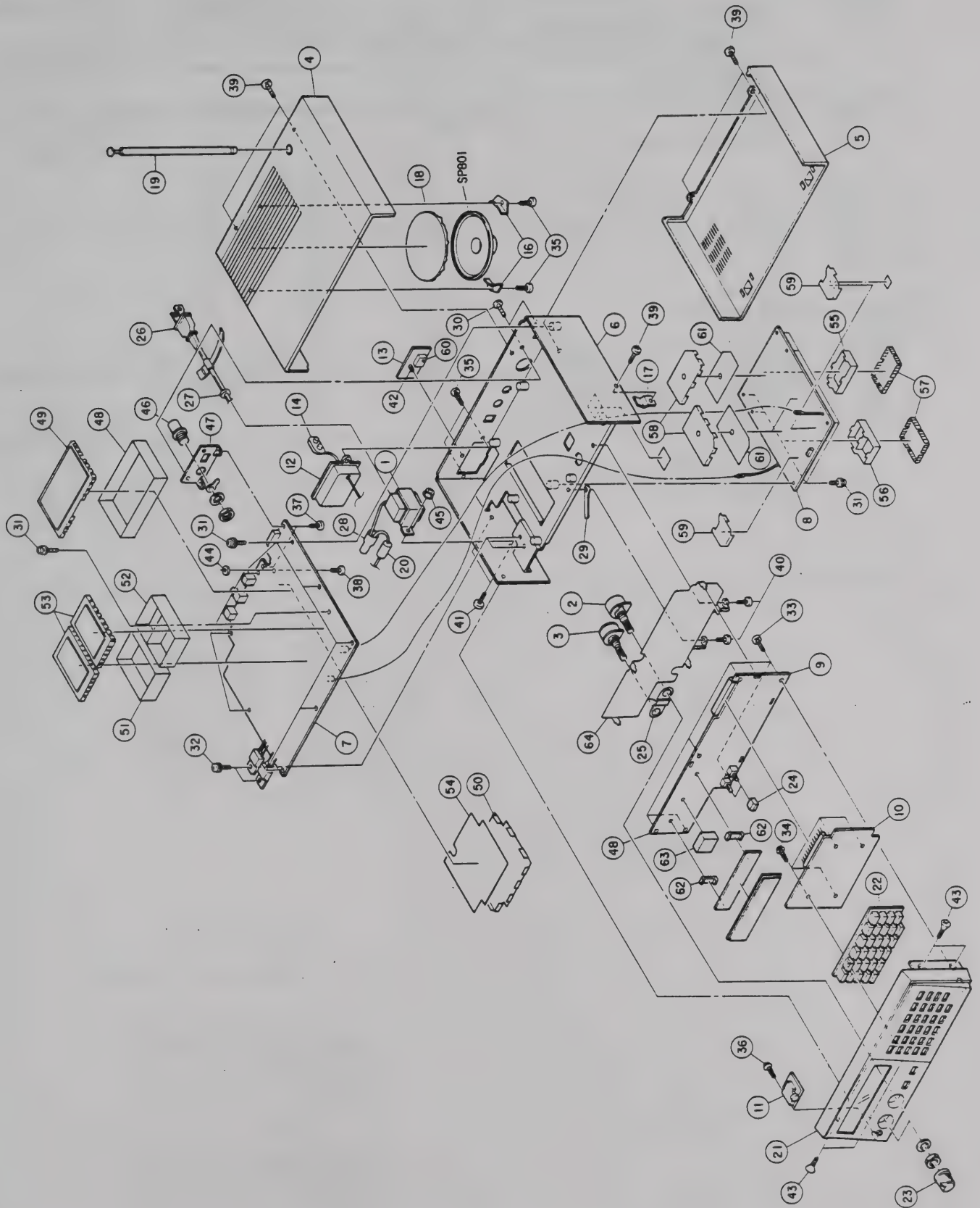
Ref. No.	Description				RS PArt No.	MFR's Part No.
⑨	**PCB Assembly, Logic & Display Board** **Consists of the following:**					GA-88D-7817
	Capacitors					
C501	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C502	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C503	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C504	Electrolytic	100 μF	10 V	±20%		ECEA1AU101
C505	Mylar	0.047 μF	50 V	±10%		AMZ-473K50
C506	Tantalum	6.8 μF	10 V	±10%		TSD-S-1A6R8K
C507	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C508	Electrolytic	4.7 μF	50 V	±20%		ECEA1HU4R7
C509	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C510	Ceramic	0.001 μF	50 V	±10%		RMUMK212B102K
C511	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C512	Electrolytic	10 μF	16 V	±20%		ECEA1CU100
C513	Ceramic	0.01 μF	50 V	±10%		RMUMK212B103K
C514	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C515	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C516	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C517	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C518	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C519	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C520	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C521	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C522	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C523	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C524	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
C525	Ceramic	100 pF	50 V	±5%		RMUMK212SL101J
	Ceramic Resonator					
CX501	CST12.0MT					CST12.0MT
	Diodes					
D501	Chip	HSR277		(Silicon)		HSR277
D502		1S2076A		(Silicon)		1S2076A
D503		1S2076A		(Silicon)		1S2076A
	Diode Arrays					
DA501	Chip	IMN10		(Silicon)		IMN10
DA502	Chip	IMN10		(Silicon)		IMN10
DA503	Chip	IMN10		(Silicon)		IMN10

Ref. No.	Description	RS Part No.	MFR's Part No.
	Crystal		
X301	Crystal 10 MH		TX1824G-3
	Miscellaneous		
CN301	Connector 10 Pin Male		PI22A10M
CN302	Connector 4 Pin Male		3022-04A
SW301	Switch		SKHHLP
TP301	Pin, Test		GE-87D-7290
TP302	Pin, Test		GE-87D-7290
(55)	Shield, Case (C)		GE-86D-6376
(56)	Shield, Case (B)		GE-86D-6372
(57)	Shield, Cover Top		GE-88D-7571
(58)	Shield, Cover Bottom		GE-86D-6510
(59)	Shield, Plate Bottom		GE-88D-7890
(61)	Fiber, Cover Shield (Bottom)		GE-86D-6514

Ref. No.	Description				RS Part No.	MFR's Part No.
R508	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R509	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R510	Metal Glaze	180 kohm	1/10 W	±5%		RCM184J55
R511	Metal Glaze	22 ohm	1/10 W	±5%		RCM220J55
R512	Metal Glaze	6.8 kohm	1/10 W	±5%		RCM682J55
R513	Metal Glaze	150 ohm	1/10 W	±5%		RCM151J55
R514	Metal Glaze	560 kohm	1/10 W	±5%		RCM564J55
R515	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R516	Metal Glaze	1 Mohm	1/10 W	±5%		RCM105J55
R517	Metal Glaze	100 kohm	1/10 W	±5%		RCM104J55
R518	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R519	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R520	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R521	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R522	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R523	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R524	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R525	Metal Glaze	47 kohm	1/10 W	±5%		RCM473J55
R526	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R527	Metal Glaze	10 kohm	1/10 W	±5%		RCM103J55
R528	Metal Glaze	47 kohm	1/10 W	±5%		RCM473J55
R529	Metal Glaze	47 kohm	1/10 W	±5%		RCM473J55
R530	Metal Glaze	47 kohm	1/10 W	±5%		RCM473J55
R531	Metal Glaze	47 kohm	1/10 W	±5%		RCM473J55
R532	Metal Glaze	47 kohm	1/10 W	±5%		RCM473J55
	Transformer					
T501	Transformer					5N75TK
	Miscellaneous					
CN501	Connector, Socket		13 Pin Female			5124-13BHPB
SW501	Switch, Push					SPF-P220NLB
SW502	Switch Push					SPF-P220NLB
(62)	Holder, LCD					GE-88D-7609
(63)	Cushion, LCD					GE-88D-7835
(64)	Shield, Logic					GE-88D-7569

Ref. No.	Description	RS Part No.	MFR's Part No.
	EL		
EL501	Electoro Luminescent		GE-88D-7738
	ICs		
IC501	GRE-0918 CPU (C-MOS)		GRE-0918
IC502	SN74LS145NS Decorder (Bipolar)		SN74LS145NS
IC503	TD62504F Driver (Bipolar)		TD62504F
IC504	μPD-7225G LCD Cont. (C-MOS)		μPD-7225G
IC505	LC3517BM-10,12,15 Memory (C-MOS) or LC3517BML-10,12, 15 or UM6116M-2D or CXK5816M-10L,12L, 15L		LC3517BM-10,12,15 or LC3517BML-10,12, 15 or UM6116M-2D or CXK5816M-10L,12L, 15L
	Inductors		
L501	Coil, Choke 100 μH		LAL03NA101K
L502	Coil, Choke 100 μH		LAL03NA101K
L503	Coil, Choke 100 μH		LAL03NA101K
	LCD		
LCD501	LCD		LTP8E3011A
	LED		
LED501	TLR226		TLR226
	Transistor		
Q501	RN2401 (Marked YA) PNP		RN2401
Q502	RN2401 (Marked YA) PNP		RN2401
Q503	RN2401 (Marked YA) PNP		RN2401
Q504	RN2401 (Marked YA) PNP		RN2401
Q505	RN2401 (Marked YA) PNP		RN2401
Q506	RN2401 (Marked YA) PNP		RN2401
Q507	RN2401 (Marked YA) PNP		RN2401
Q508	2SC1623 (Marked L5) NPN		2SC1623
	Resistor		
R501	Metal Glaze 100 ohm 1/10 W ±5%		RCM101J55
R502	Metal Glaze 3.3 kohm 1/10 W ±5%		RCM332J55
R503	Metal Glaze 5.6 kohm 1/10 W ±5%		RCM562J55
R504	Metal Glaze 150 ohm 1/10 W ±5%		RCM151J55
R505	Metal Glaze 47 ohm 1/10 W ±5%		RCM470J55
R506	Metal Glaze 100 kohm 1/10 W ±5%		RCM104J55
R507	Metal Glaze 10 kohm 1/10 W ±5%		RCM103J55

DISASSEMBLY/EXPLODED VIEW



Key Board PCB Assembly

Ref. No.	Description	RS Part No.	MFR's Part No.
⑩	**Assembly, PCB KeyBoard** **Consists of the following:**		**GA-88D-7818**
	Miscellaneous		
CN601 J601	Connector, Pin 13 Pin Male Pin, Test (Jumper)		3022-13B GE-87D-7290

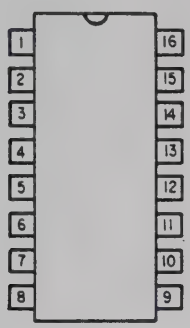
Headphone PCB Assembly

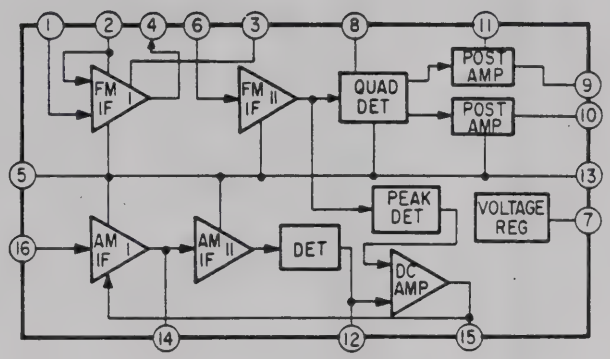
Ref. No.	Description	RS Part No.	MFR's Part No.
⑪	**Assembly, PCB Headphone** **Consists of the following:**		**GA-89D-8302**
	Miscellaneous		
J801	Jack, Headphone		MOJ-B24-5

SEMICONDUCTOR LEAD IDENTIFICATION AND IC CIRCUIT DIAGRAM

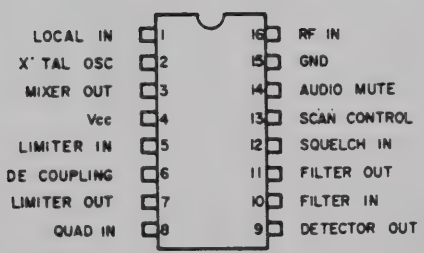
Integrated Circuit Lead Identification, Liner PCB

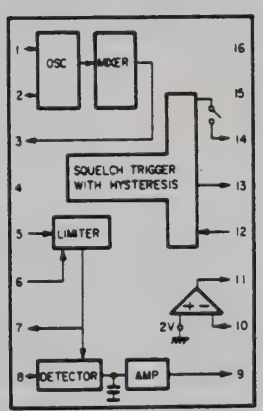
IC1 HA12413 or KA2243N



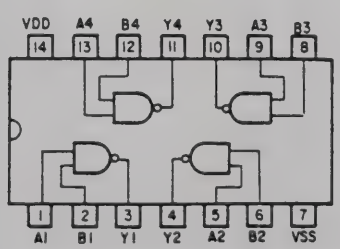


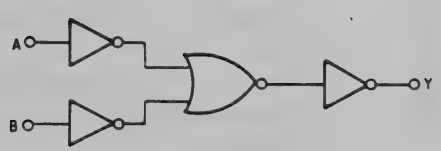
IC2 TK10420





IC3 μPD4011BC or HD14011BP

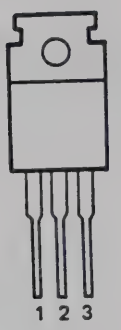




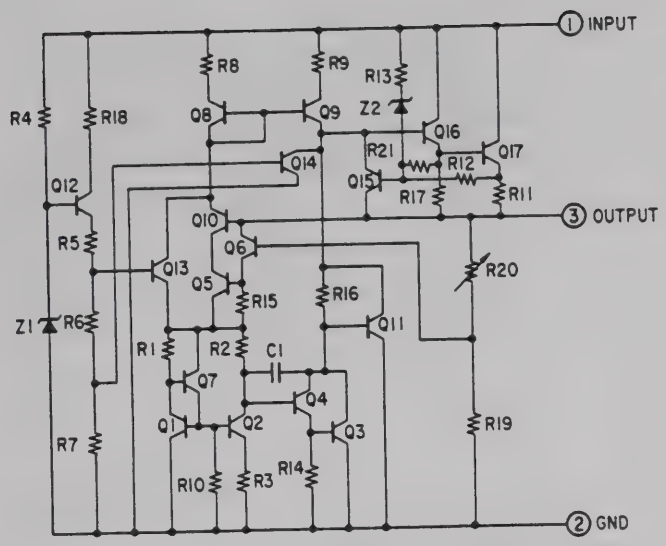
EXPLODED VIEW PARTS LIST
(Disassembly/Exploded View)

Ref. No.	Description	RS Part No.	MFR's Part No.
SP801	Speaker 8 ohm 1 W		S08J18
⚠ ① T801	Transformer, Power		GE-84D-5158
② VR801	Pot. Squelch Control 10 kohm (C)		K1611008TE-10KC-20
③ VR802	Pot. Volume Control 50 kohm (A)		VM11A-5M1411 -50KA-20
④	Cabinet, Top		GE-88A-7603
⑤	A'ssy, Cabinet Bottom		GE-88D-7888
⑥	Chassis		GE-88A-7611
⑫	Box, Battery		GE-21D-5728
⑬	Cover, Battery		GE-79D-0113
⑭	Snap, Battery L = 250 mm		I Type
⑯	Holder, Speaker		GE-84D-4580
⑰	Holder, Wire		GE-88D-7892
⑱	Himelon, Speaker		GE-88D-7681
⑲	Antenna, Telescopic		GE-88D-7597
⚠ ⑳ R801	Solid 1.8 Mohm 1/2 W ±10%		ERC-12GK185
㉑	A'ssy, Escutcheon Front		GA-89D-8303
㉒	Top, Key		GE-88D-7610
㉓	Knob, Volume/Squelch		GE-88D-7607
㉔	Knob, Switch Push		GE-88D-7608
㉕	Plate, Ground		GE-88D-7613
㉖	Cord, AC		APC-7W-SPT1 AWG2/18
㉗	Strainrelief, Line Cord		SR-3P-4
㉘	Terminal		1-SD
㉙	Lug, L = 27 mm		3 mm
㉚	Screw, Panhead with SW (Ni)		PM 2.6 x 5
㉛	Screw, Panhead with SW/FW (Ni)		PM 3 x 6
㉜	Screw, Panhead with SW/FW (Ni)		PM 3 x 8
㉝	Screw, Panhead P tight		P tight 2.6 x 6
㉞	Screw, Panhead P tight		P tight 2 x 8
㉟	Screw, Panhead P tight		P tight 3 x 8
㊱	Screw, TP Tapping		TP 2 x 6
㊲	Screw, Panhead Tapping		PT 2.6 x 6
㊳	Screw, Panhead (Ni)		PM 3 x 8
㊴	Screw, Bindinghead (Ni)		BM 3 x 6
㊵	Screw, Bindinghead Tapping		BT 3 x 5
㊶	Screw, Special Bindinghead		BM 4 x 8
㊷	Screw, Bindinghead		GE-79D-0541
㊸	Screw, Countersunkhead		CM 3 x 6
㊹	Nut		3-DIA
㊺	Nut Flange Serrated		4-DIA
㊿	Cushion, Battery		GE-21D-5795
	Wire Kit		#918(A)
	Hardware Kit		#918(B)
	Wire Binder		PLT1M-M or BK-1

IC8 MC7805C or TA78005AP

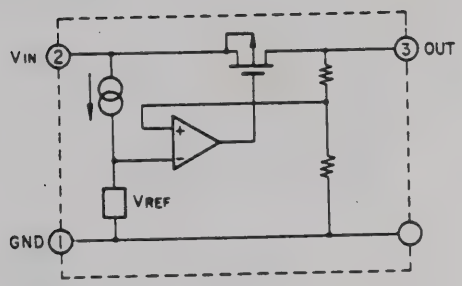


1. INPUT
2. GND
3. OUTPUT

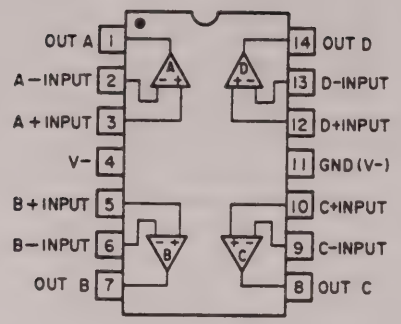


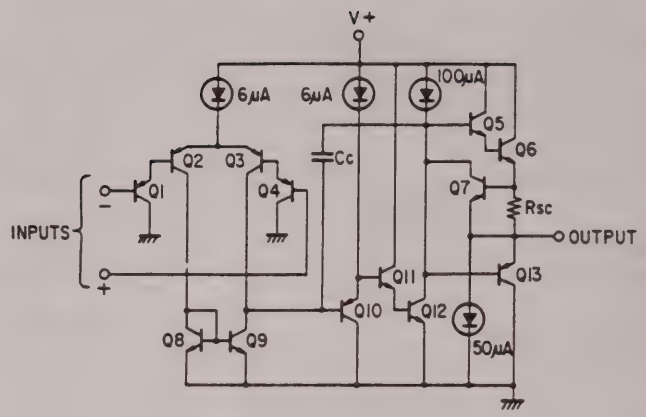
IC9 S-81250HG

1. GND
2. INPUT
3. OUTPUT

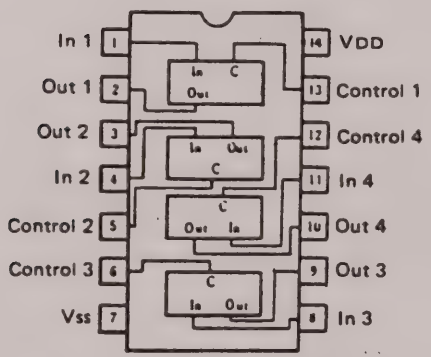


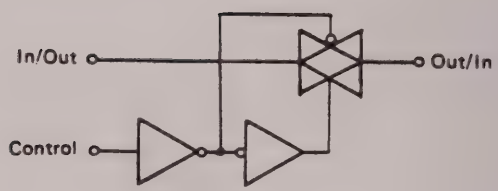
IC4, 5 μPC324C



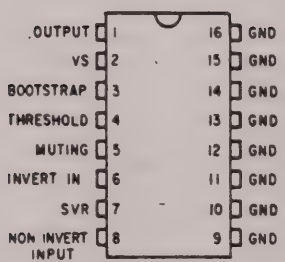


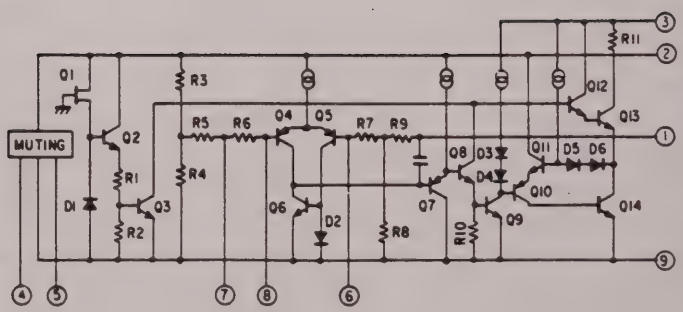
IC6 HD14066BP or μPD4066BC





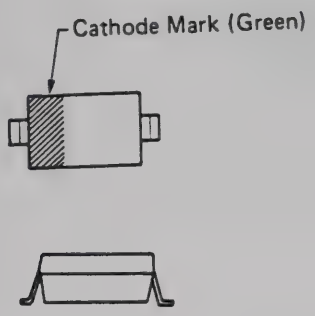
IC7 TDA1905



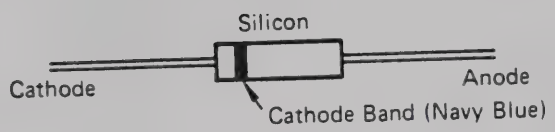


Diode Identification and Lead Polarity, Liner PCB

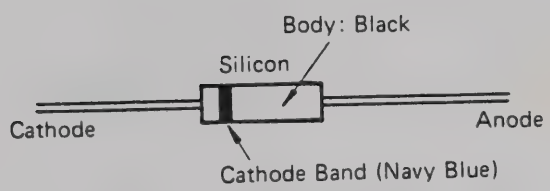
(A) HSR277



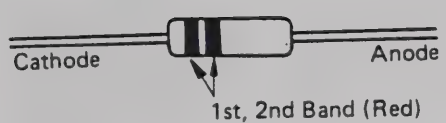
(B) 1S2076A



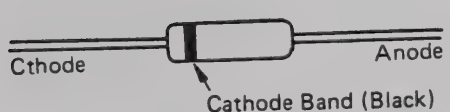
(C) 1S1585



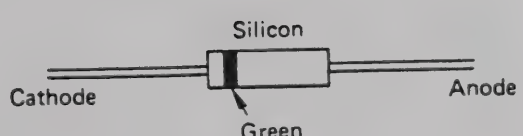
(D) 1K261



(E) 0A90R



(F) 1SS81

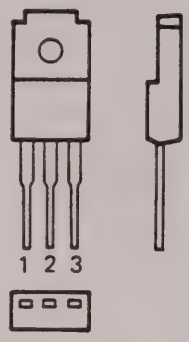


Transistor Lead Identification, Liner PCB

(A) 2SC2712 (Y,GR)(Marked LY,LG)
2SC2714 (Y)(Marked QY)
2SA1162 (Y,GR)(Marked SY,SG)
2SC3356 (Marked R22)
RN2405 (Marked YE)
RN1408 (Marked XI)

1. EMITTER
2. BASE
3. COLLECTOR

(B) 2SD1406 (GR)



1. BASE
2. COLLECTOR
3. EMITTER

(C) 2SC2458 (GR)

1. EMITTER
2. COLLECTOR
3. BASE

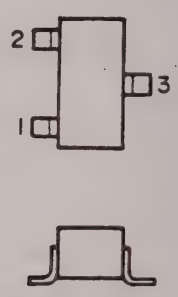
(D) 2SC3243

① EMITTER
② COLLECTOR
③ BASE

(E) 2SC2603(F)

① EMITTER
② COLLECTOR
③ BASE

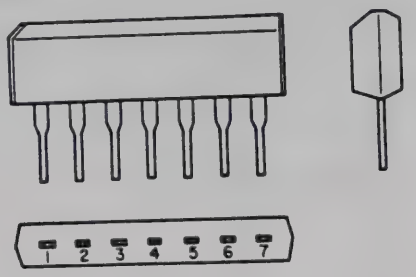
(F) 2SK210 (GR)
(Marked YG)

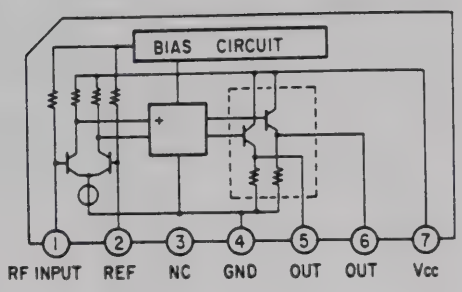


1. GATE
2. DRAIN
3. SOURCE

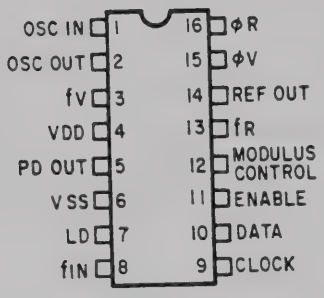
Integrated circuit Lead Identification, PLL PCB

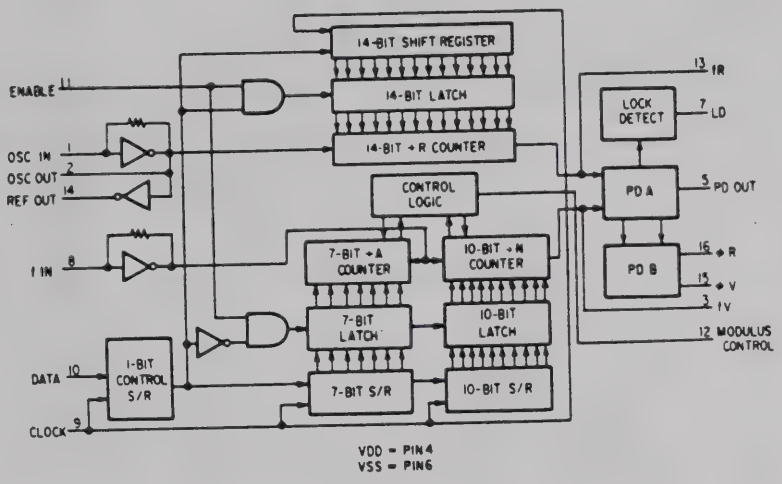
IC301 TD6105AP



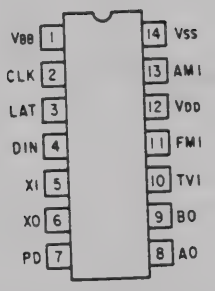


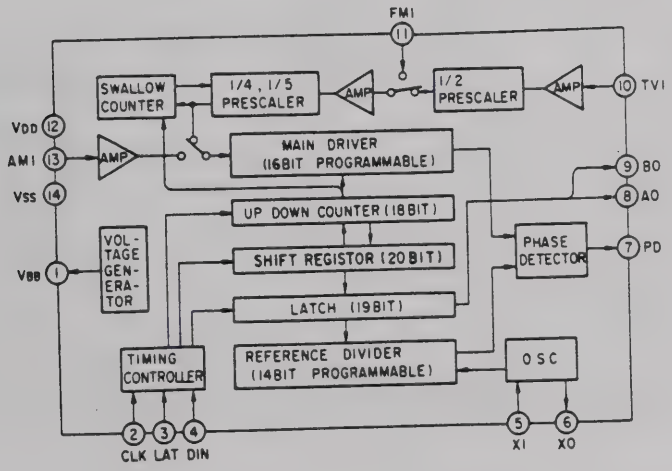
IC302 MC145158



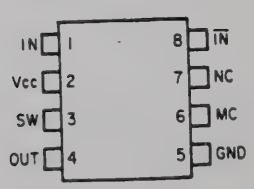


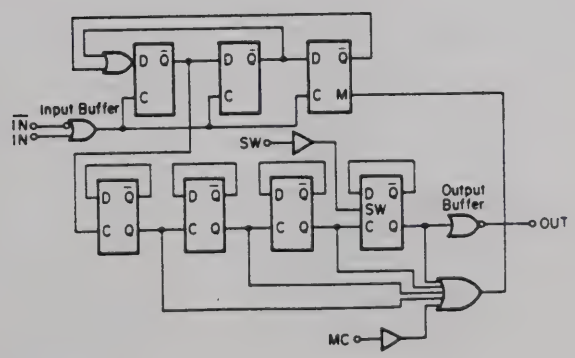
IC303 CX7925B



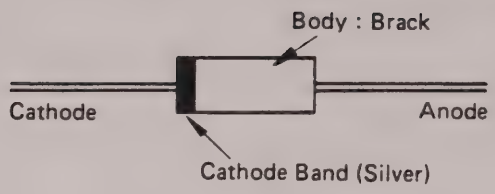


IC304 MB501L

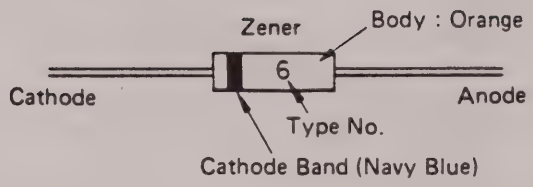




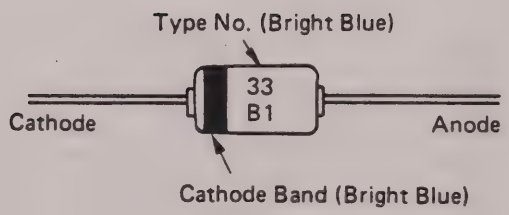
(G) 1N4002



(H) HZ6B2L, HZ9BLL
HZ11BLL

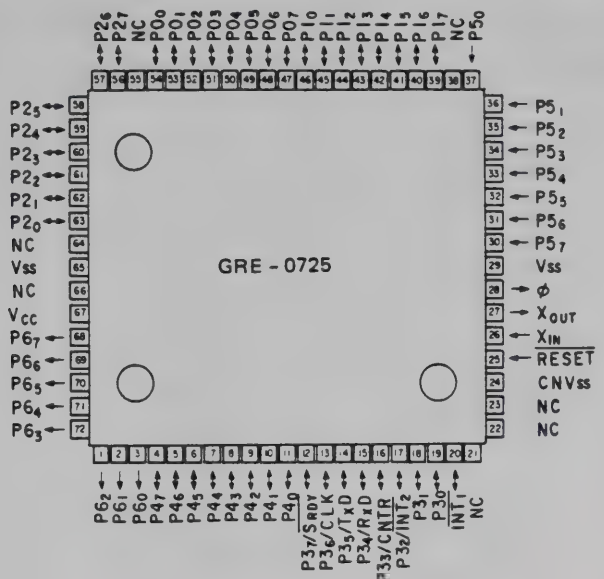


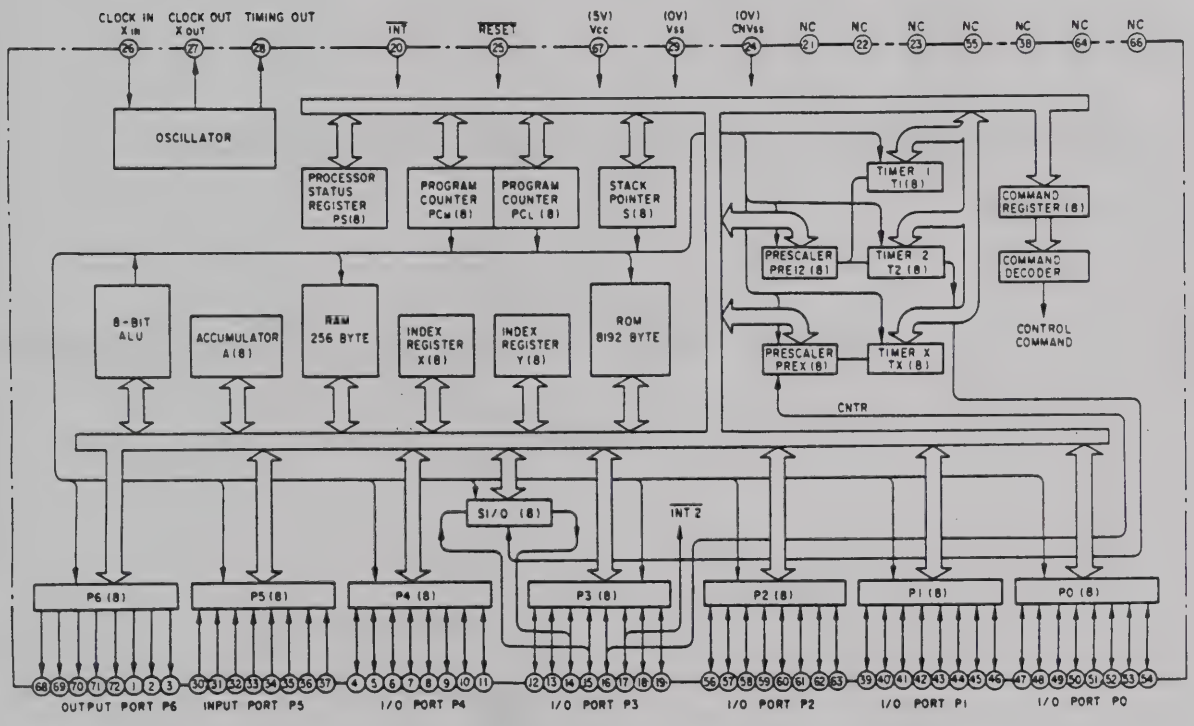
(I) HZ33E



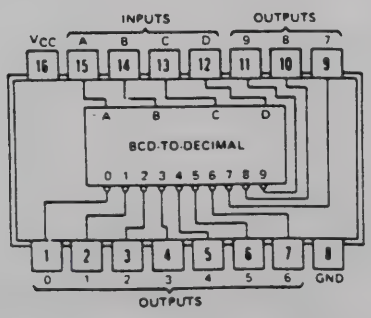
Integrated Circuit Lead Identification, Logic & Display

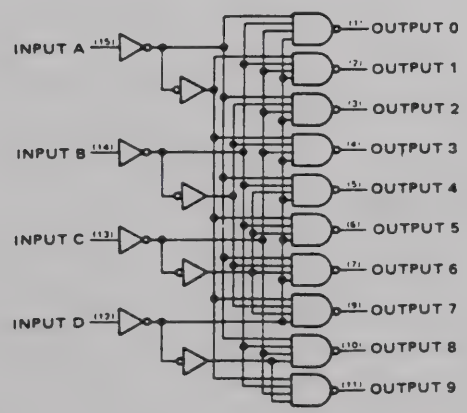
IC501 GRE-0918





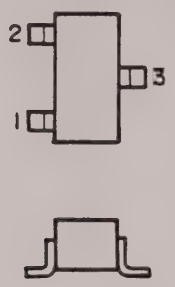
IC502 SN74LS145NS





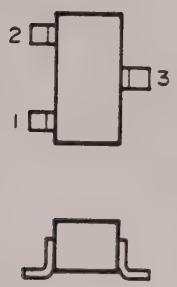
Transistor Lead Identification, Logic & Display

(A) 2SC3356 (Marked R22)
RN2405 (Marked YE)
2SC2712 (GR)(Marked LG)



1. EMITTER
2. BASE
3. COLLECTOR

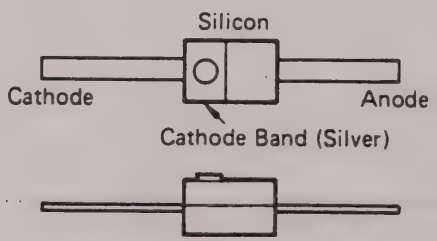
(B) 2SK209 (Marked XG)



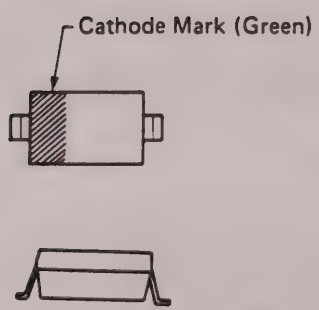
1. DRAIN
2. SOURCE
3. GATE

Diode Identification and Lead Polarity, Logic & Display

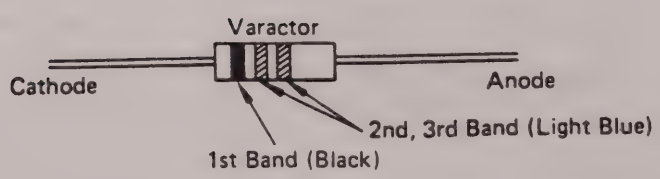
(A) 1T25



(B) HSR277

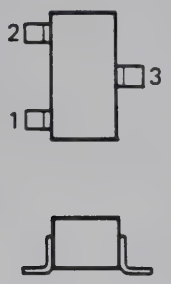


(C) 1SV89



Transistor Lead Identification, Logic & Display

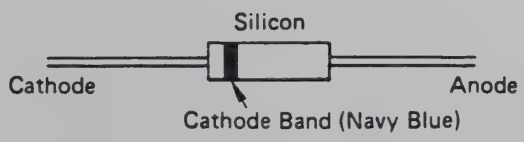
(A) RN2401
2SC1623



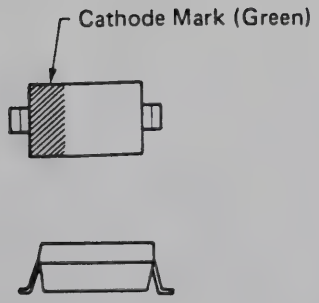
1. EMITTER
2. BASE
3. COLLECTOR

Integrated Circuit Lead Identification, Logic & Display

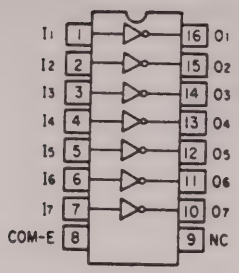
(A) 1S2076A

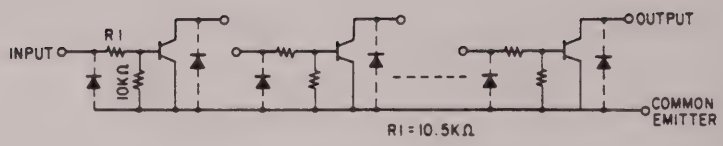


(B) HSR277



IC503 TD62504F





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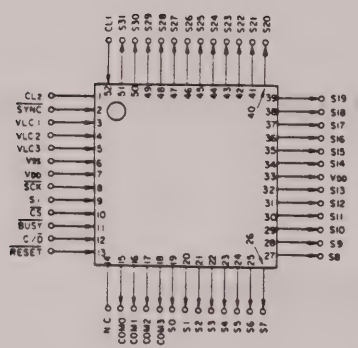
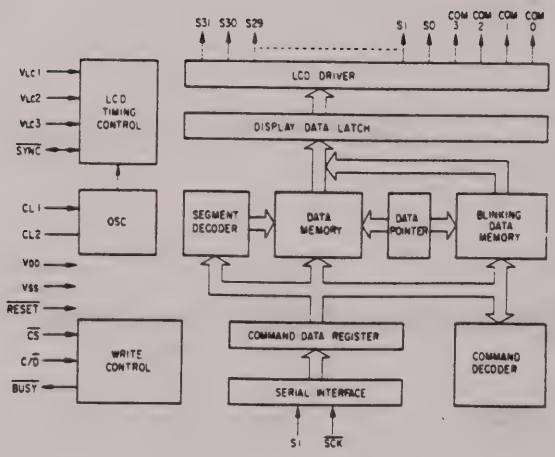
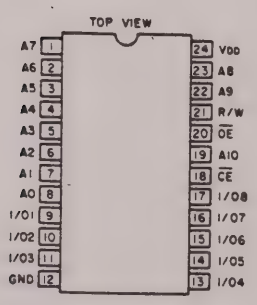
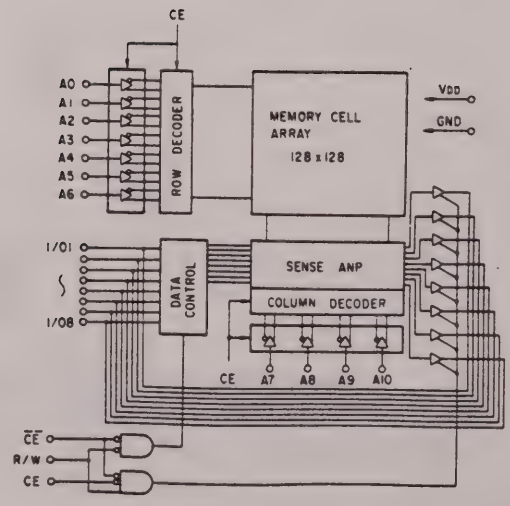




IC505 TC5517CF-20 or LC3517BM-15





MICROPROCESSOR (IC-501) PIN LOCATION

Pin No.	Symbol	Function	Pin No.	Symbol	Function
1	P62	Memory address 10 (A10)	37	P50	USA/etc., Cellular Switch
2	P61	Memory address 9 (A9)	38	NC	NC
3	P60	Memory address 8 (A8)	39	P17	WFM Output
4	P47	$\overline{\text{Search}}$ Output	40	P16	NFM Output
5	P46	NC	41	P15	AM Output
6	P45	Mute Output	42	P14	RF Filter Switch
7	P44	LCD Reset Output	43	P13	RF Filter Switch
8	P43	LCD C/$\overline{\text{D}}$ Output	44	P12	RF Filter Switch
9	P42	LCD $\overline{\text{CS}}$ Output	45	P11	VCO2 Output
10	P41	PLL2 Latch Output	46	P10	VCO1 Output
11	P40	PLL1 Latch Output	47	P07	Memory address 7 (A7)
12	P37/$\overline{\text{SRDY}}$	5 kHz Step Output	48	P06	Memory address 6 (A6)
13	P36/CLK	Serial Clock Output	49	P05	Memory address 5 (A5)
14	P35/TXD	Serial Data Output	50	P04	Memory address 4 (A4)
15	P34/RXD	NC	51	P03	Memory address 3 (A3)
16	P33/$\overline{\text{CNTR}}$	Peep Output	52	P02	Memory address 2 (A2)
17	P32/$\overline{\text{INT2}}$	Hold Output	53	P01	Memory address 1 (A1)
18	P31	$\overline{\text{Sound Squelch}}$ Input	54	P00	Memory address 0 (A0)
19	P30	NC	55	NC	NC
20	$\overline{\text{INT1}}$	+5 V	56	P27	Memory I/O 8
21	NC	NC	57	P26	Memory I/O 7
22	NC	NC	58	P25	Memory I/O 6
23	NC	NC	59	P24	Memory I/O 5
24	CNVSS	GND	60	P23	Memory I/O 4
25	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$ Input	61	P22	Memory I/O 3
26	XIN	Clock Input	62	P21	Memory I/O 2
27	XOUT	Clock Output	63	P20	Memory I/O 1
28	ø	Timing Output	64	NC	NC
29	VSS	0 V	65	VSS	0 V
30	P57	LCD $\overline{\text{Busy}}$	66	NC	NC
31	P56	Low Battery Input	67	VCC	+5 V
32	P55	$\overline{\text{Carrier Squelch}}$ Input	68	P67	VCO Filter 2 Output
33	P54	Key Input	69	P66	VCO Filter 1 Output
34	P53	Key Input	70	P65	Memory $\overline{\text{CE}}$ Output
35	P52	Key Input	71	P64	Memory R/$\overline{\text{W}}$ Output
36	P51	Key Input	72	P63	Memory $\overline{\text{OE}}$ Output

MICROPROSESSOR (IC-501) FUNCTION TABLE

(1) Outputs of VCO (P10, P11) and VCO filter (P66, P67)

Receiving Frequency (MHz)	VCO Output	VCO filter Output
25.0000 to 220.4950	VCO 1 (P10) "H"	VCO filter 1 (P66) "H" Level
220.5000 to 520.0000	VCO 2 (P11) "H"	
760.0000 to 1052.4950	VCO 1 (P10) "H"	VCO filter 2 (P67) "H" Level
1052.5000 to 1300.0000	VCO 2 (P11) "H"	

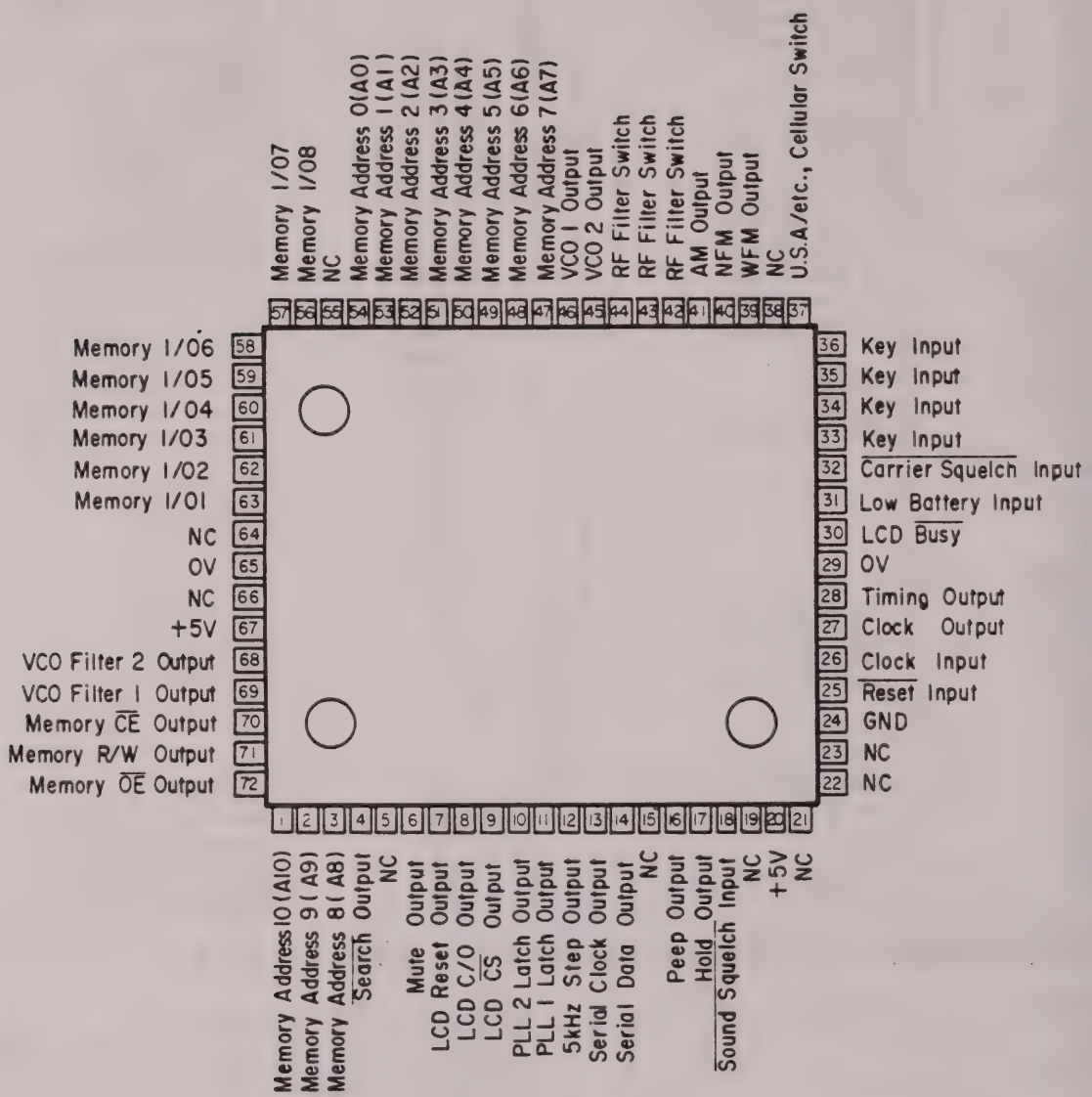
(2) Outputs of RF filter (P12, P13, P14)

Receiving Frequency (MHz)	P12	P13	P14
25.0000 to 39.9950	H	L	L
40.0000 to 67.9950	L	H	L
68.0000 to 107.9950	H	H	L
108.0000 to 173.9950	L	L	H
174.0000 to 279.9950	H	L	H
280.0000 to 520.0000	L	H	H
760.0000 to 1300.0000	H	H	H

(3) Outputs of Search (P47) and 5 kHz Step (P37)

			$\overline{\text{Search}}$ Output (P47)	5 kHz Step Output (P37)
MANUAL Operation			H	L
PROGRAM Operation			H	L
SCAN Operation			H	L
In SEARCH Operation	Receiving Frequency 25 to 520 MHz	at 5 kHz Step	L	H
		at Other Step	L	L
	Receiving Frequency 760 to 1300 MHz	at 5 kHz Step	L	H
		at Other Step	L	L

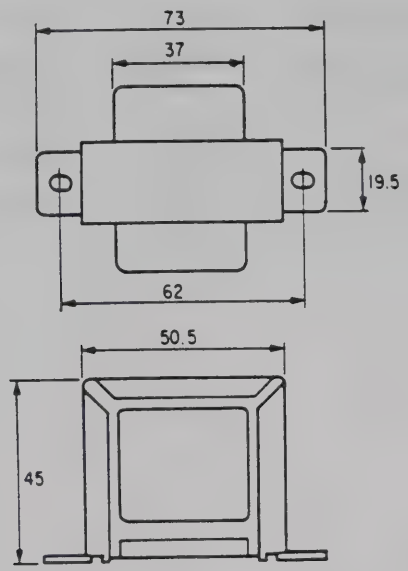
MICROPROSESSOR (IC-501) PIN ALLOCATION

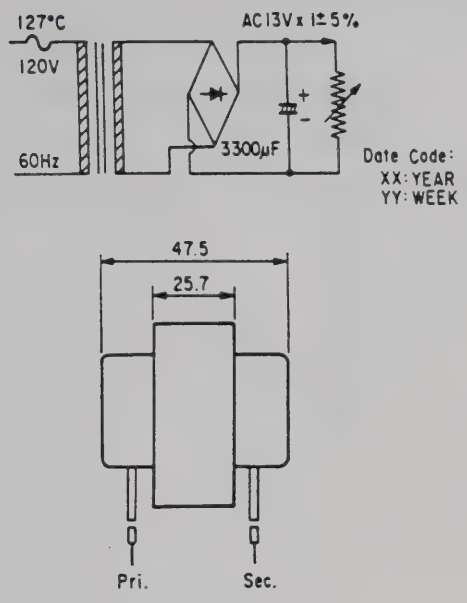


POWER TRANSFORMER SPECIFICATION

for U.S.A, CANADA

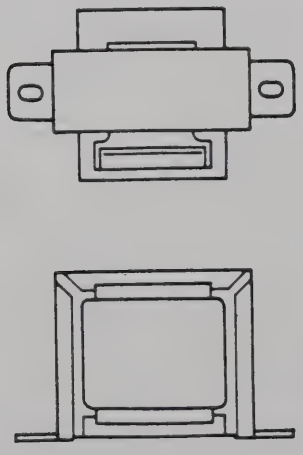
Rated primary voltage and frequency	120 V 60 Hz
Open circuit primary current	Less then 100 mA at 120 V 60 Hz
secondary output voltage	
(No load voltage)	DC 17 V ±5%
(Reated voltage)	DC 13 V ±5% at DC 500 mA
Protector	127 °C 250 V 2.5 A

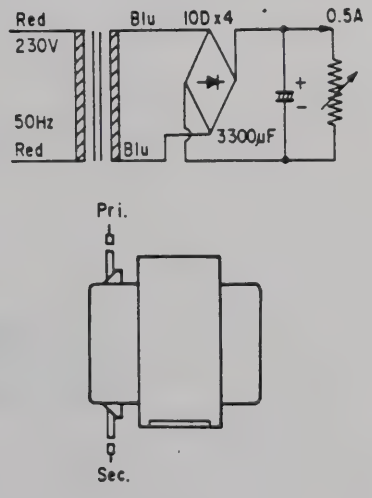




for BELGIUM, FRANCE, U.K. and AUSTRALIA

Rated primary volrage and frequency	230 V 50 Hz
Open circuit primary current	Less then 50 mA at 230 V 50 Hz
Secondary output voltage	
(No load voltage)	DC 17.3 V ±5%
(Rated voltage)	DC 13 V ±5%
Protector	133 °C 250 V 1.5 A





APPENDIX

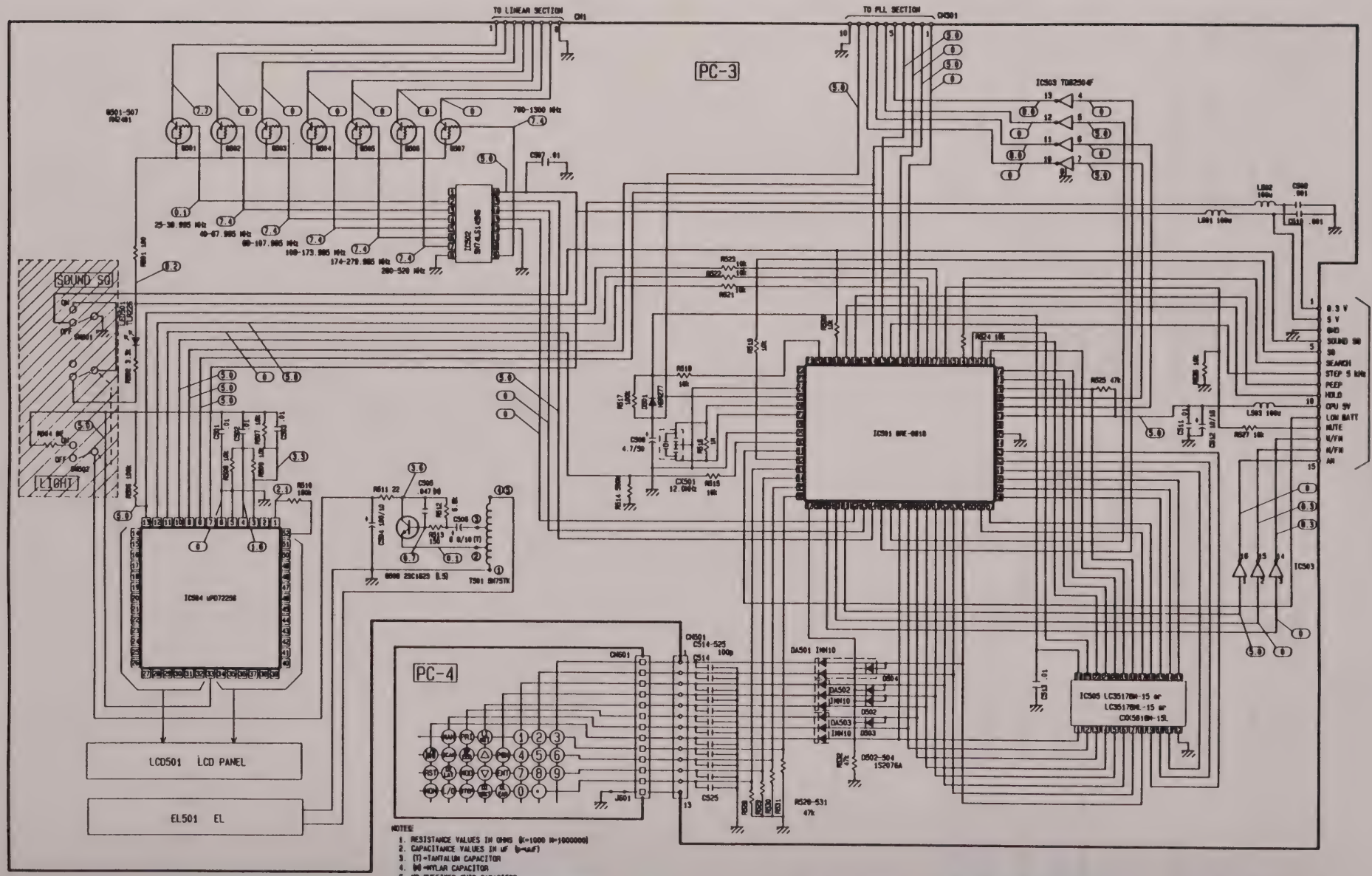
Ref. No	Description	USA	CANADA	AUSTRALIA	U.K.	BELGUIM
D502	1S2076A (Silicon)	1S2076A	1S2076A	Not used	Not used	Not used
D504	1S2076A (Silicon)	Not used	Not used	1S2076A	1S2076A	1S2076A
R801	Resistor Solid 1/2W 1.8Mohm 1/2W	ERC-12GK185	ERC-12GK185	Not used	Not used	Not used
T801	Transformer, Power	GE84D-5158	GE-84D-5158	K6862	K6862	K6862
	Cord, AC	APL-7W-SPT1 AWG 2/18	APL-7W-SPT1 AWG 2/18	P2-VCTF-LD-AS	2-VCTFK-LD-BS $2x0.75mm^2$	HARCLASS II BLK 2m
	Strain relief, Line cord	SR-3P-4	SR-3P-4	SR-5N-4	SR-4N-4	SR-4N-4
	Chassis	GE-88A-7611	GE-88A-7611	GE-88A-7611A	GE-88A-7611A	GE-88A-7611A

RADIO SHACK
A Division of Tandy Corporation
Fort Worth, Texas 76102

3A2

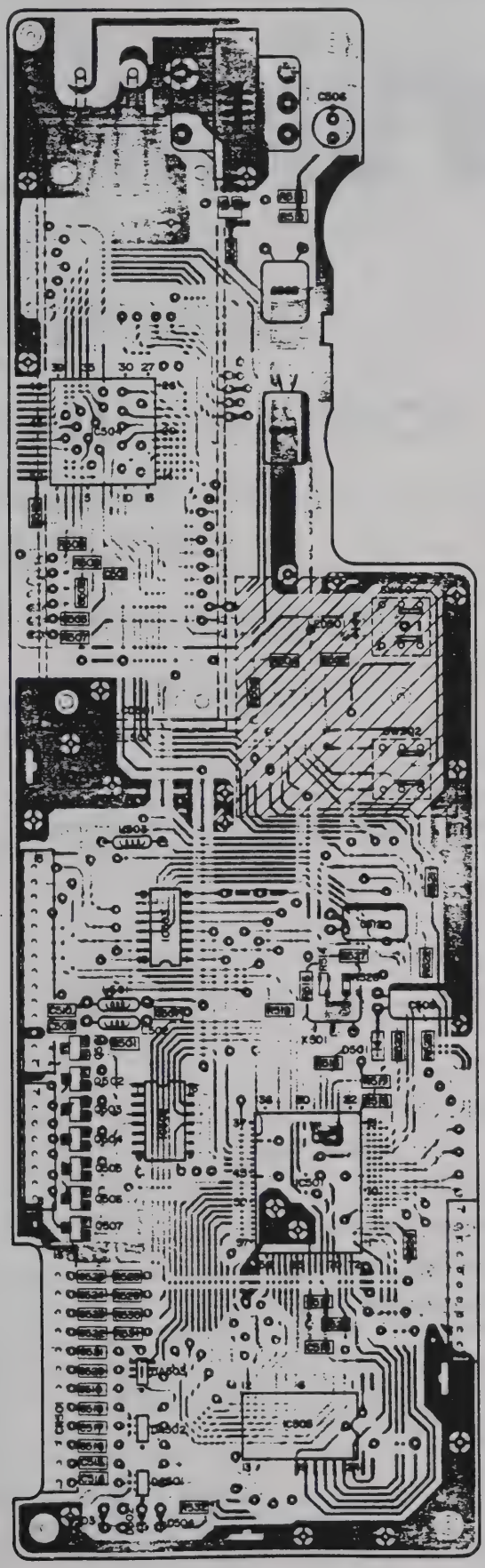
Printed in Japan

SCHEMATIC DIAGRAM (CPU SECTION)



	D502	D504
U.S.A., CANADA MODELS	USED	NOT USED
AUSTRALIA, UK, BELGIUM, FRANCE MODELS	NOT USED	USED

LOGIC & DISPLAY PCB (Top View)



	D502	D504
U.S.A., CANADA MODELS	USED	NOT USED
AUSTRALIA, UK, BELGIUM, FRANCE MODELS	NOT USED	USED

REALISTIC®

Service Manual

20-145A

ADDENDUM

TO SERVICE MANUAL FOR
Cat. No. 20-145
PRO-2006
Programmable Scanner

Catalog Number: 20-145A

The 20-145A is very much like the 20-145. This addendum only notes how the 20-145A is different from the 20-145. A separate, complete service manual for the 20-145A will not be issued. Refer to the 20-145 service manual for items not covered in this addendum.
Parts marked ▭ and ▨ are different from the basic manual.

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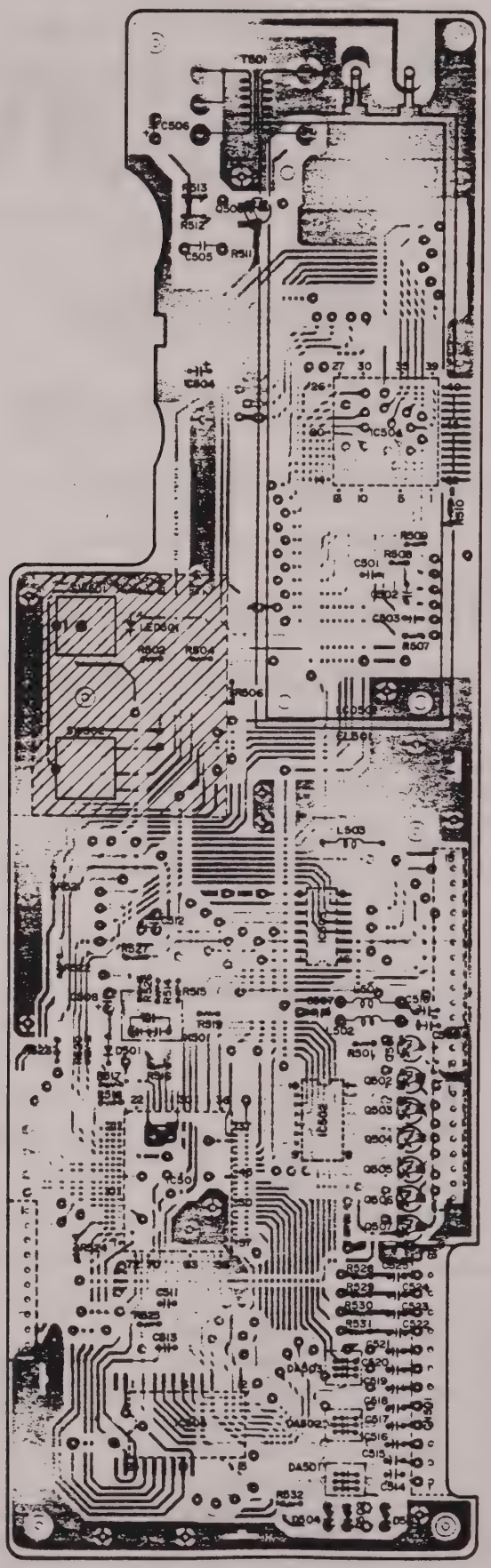
ELECTRICAL PARTS LIST

Ref. No.	Description	RS Part No.	MFR's Part No.
	EL		
EL501	Electro Luminescent		GE-88D-7738
	ICs		
IC501	GRE-0918 CPU (C-MOS)		GRE-0918
IC502	SN74LS145NS Decoder (Bipolar)		SN74LS145NS
IC503	TD62504F Driver (Bipolar)		TD62504F
IC504	µPD-7225G LCD Cont. (C-MOS)		µPD-7225G
IC505	LC3517BM-10,12,15 Memory (C-MOS) orLC3517BML-10,12, 15 or UM6116M-2D or CXK5816M-10L,12L, 15L		LC3517BM-10,12,15 orLC3517BML-10,12, 15 or UM6116M-2D or CXK5816M-10L,12L, 15L
	Inductors		
L501	Coil, Choke 100 µH		LAL03NA101K
L502	Coil, Choke 100 µH		LAL03NA101K
L503	Coil, Choke 100 µH		LAL03NA101K
	LCD		
LCD501	LCD		LTP8E3011A
	LED		
LED501	TLR226		TLR226
	Transistor		
Q501	RN2401 (Marked YA) PNP		RN2401
Q502	RN2401 (Marked YA) PNP		RN2401
Q503	RN2401 (Marked YA) PNP		RN2401
Q504	RN2401 (Marked YA) PNP		RN2401
Q505	RN2401 (Marked YA) PNP		RN2401
Q506	RN2401 (Marked YA) PNP		RN2401
Q507	RN2401 (Marked YA) PNP		RN2401
Q508	2SC1623 (Marked L5) NPN		2SC1623
	Resistor		
R501	Metal Glaze 100 ohm 1/10 W ± 5%		RCM101J55
R502	Metal Glaze 3.3 kohm 1/10 W ± 5%		RCM332J55
R504	Metal Glaze 82 ohm 1/10 W ± 5%		RCM820J55
R506	Metal Glaze 100 kohm 1/10 W ± 5%		RCM104J55
R507	Metal Glaze 10 kohm 1/10 W ± 5%		RCM103J55

LOGIC & DISPLAY PCB (Bottom View)

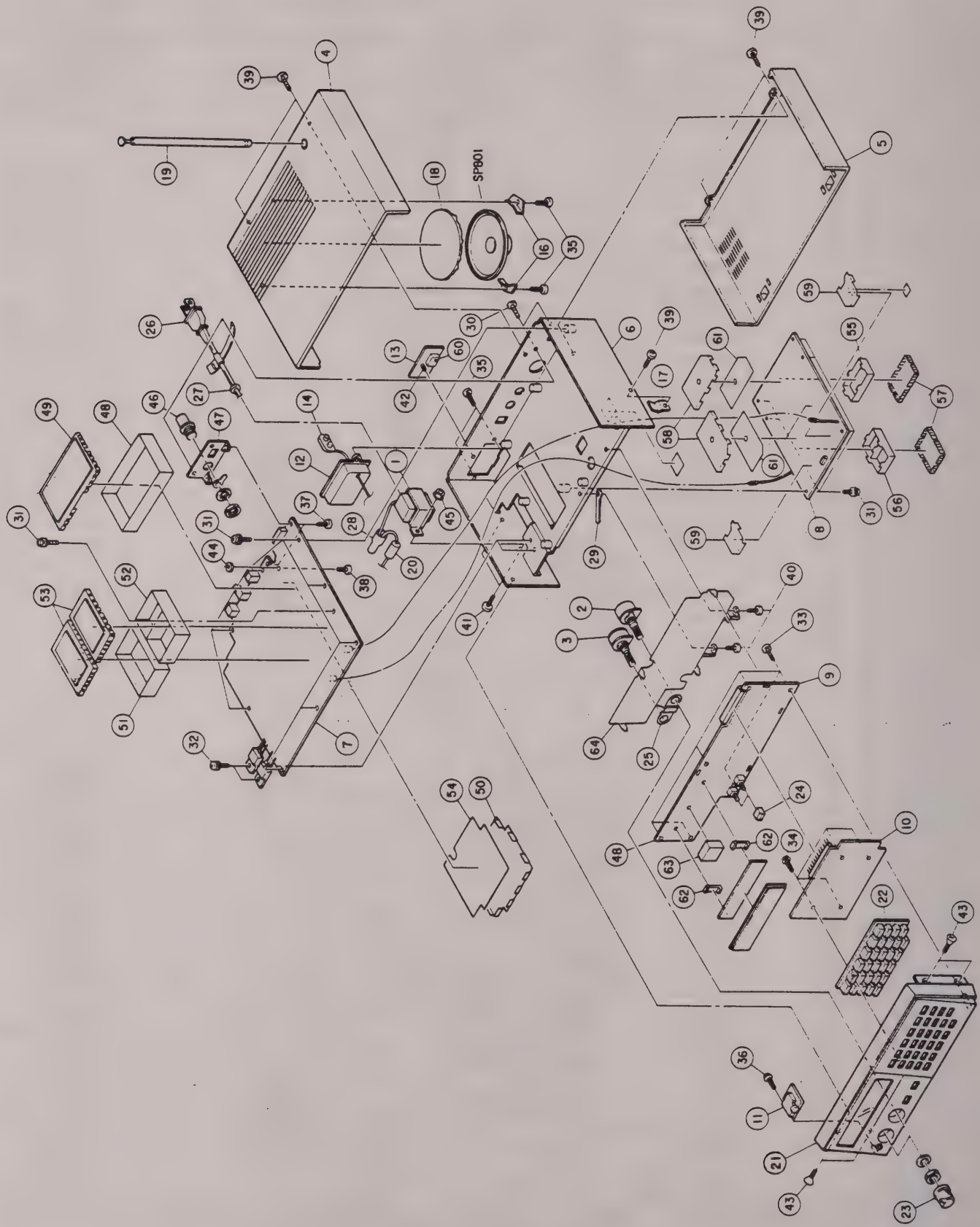


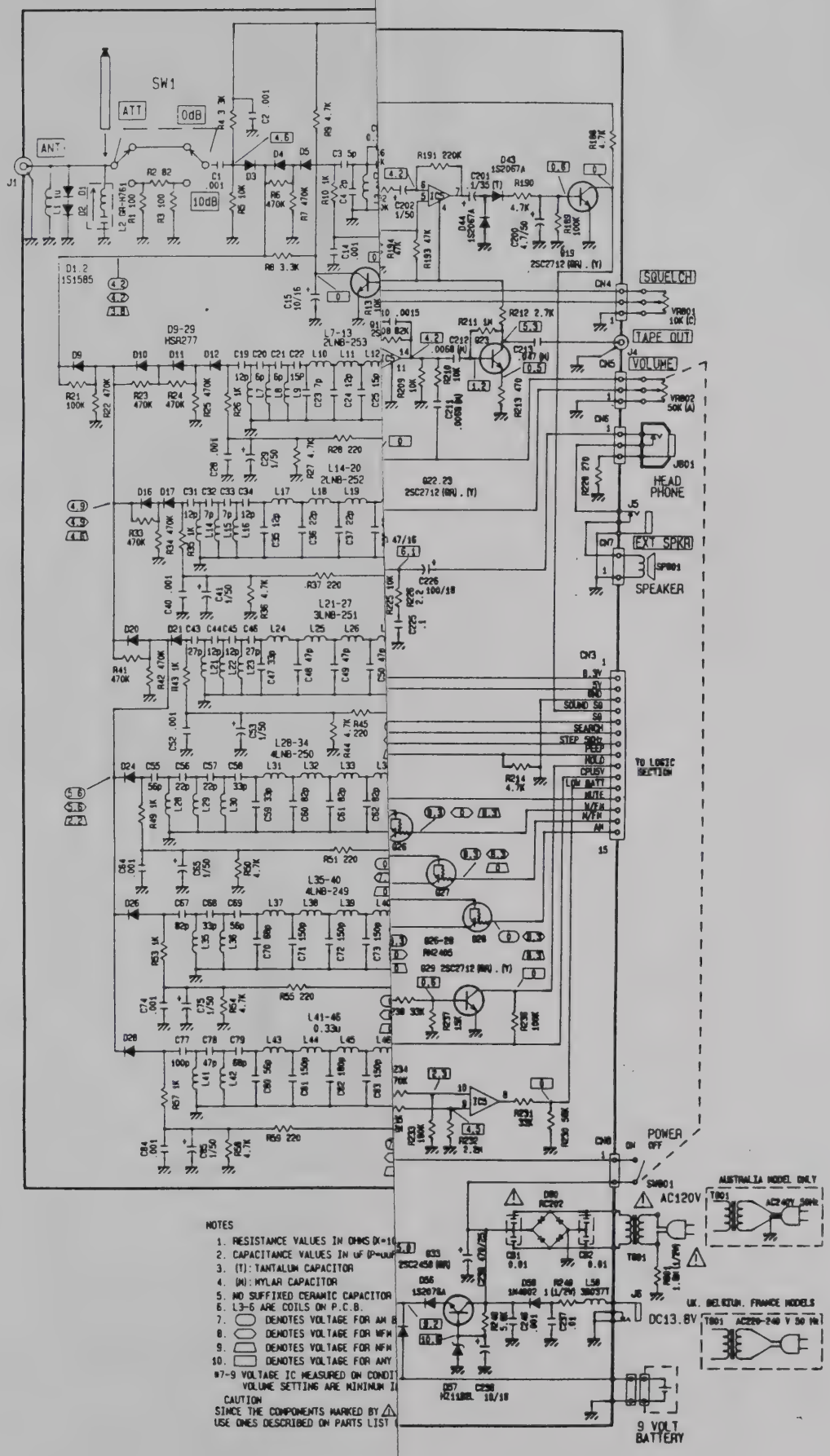
	D502	D504
U.S.A. CANADA MODELS	USED	NOT USED
AUSTRALIA, UK, BELGIUM, FRANCE MODELS	NOT USED	USED

EXPLODED VIEW PARTS LIST
(Disassembly/Exploded View)

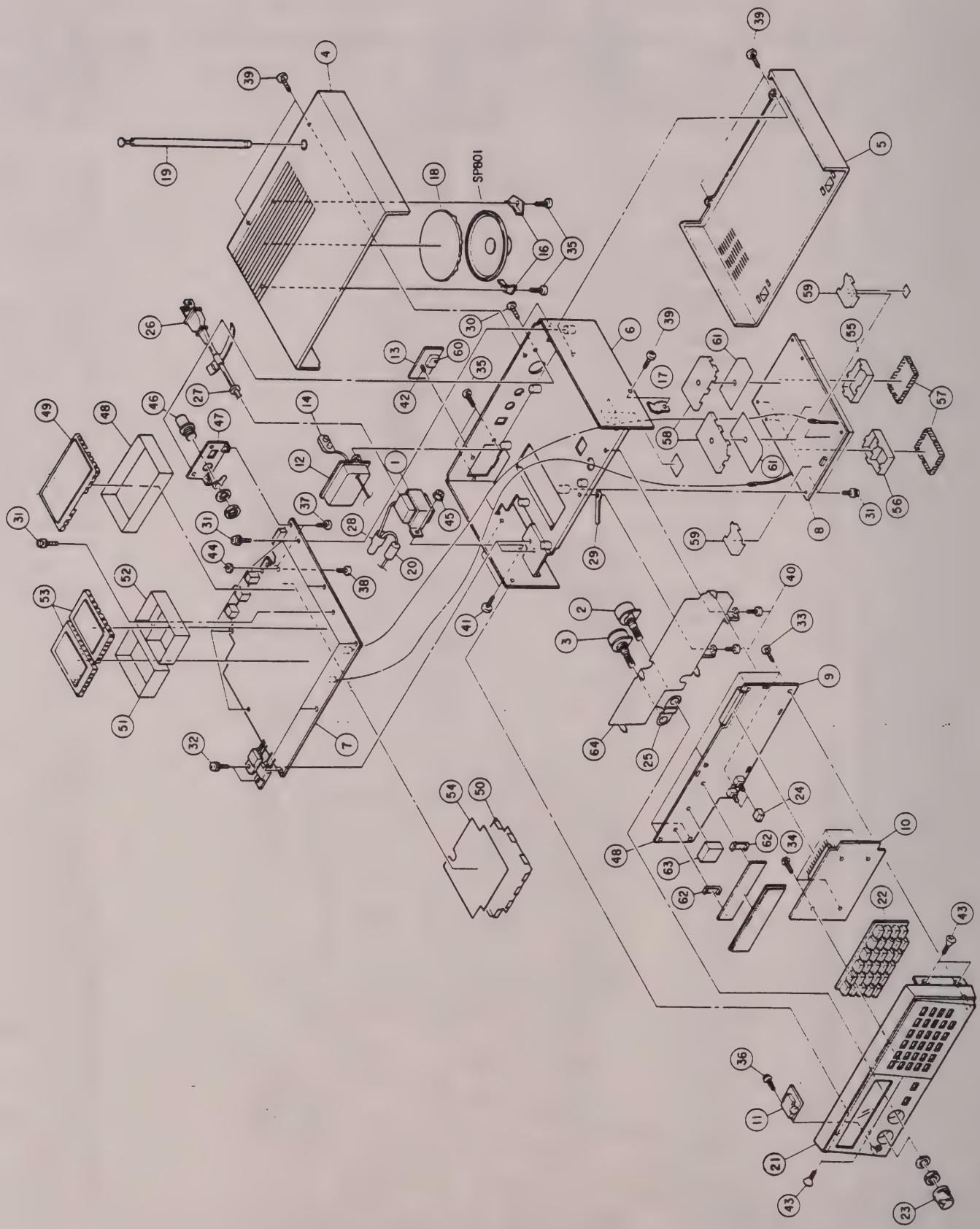
Ref. No.	Description	RS Part No.	MFR's Part No.
SP801	Speaker 8 ohm 1 W		S08J18
⚠ ① T801	Transformer, Power		GE-84D-5158
② VR801	Pot. Squelch Control 10 kohm (C)		K1611008TE-10KC-20
③ VR802	Pot. Volume Control 50 kohm (A)		VM11A-5M1411 -50KA-20
④	Cabinet, Top		GE-88A-7603
⑤	A'ssy, Cabinet Bottom		GE-88D-7888
⑥	Chassis		GE-88A-7611
⑫	Box, Battery		GE-21D-5728
⑬	Cover, Battery		GE-79D-0113
⑭	Snap, Battery L=250 mm		I Type
⑯	Holder, Speaker		GE-84D-4580
⑰	Holder, Wire		GE-88D-7892
⑱	Himelon, Speaker		GE-88D-7681
⑲	Antenna, Telescopic		GE-88D-7597
⚠ ⑳ R801	Solid 1.8 Mohm 1/2 W ± 10%		ERC-12GK185
㉑	A'ssy, Escutcheon Front		GA-910-9189
㉒	Top, Key		GE-88D-7610
㉓	Knob, Volume/Squelch		GE-88D-7607
㉔	Knob, Switch Push		GE-88D-7608
㉕	Plate, Ground		GE-88D-7613
㉖	Cord, AC		APC-7W-SPT1 AWG2/18
㉗	Strainrelief, Line Cord		SR-3P-4
㉘	Terminal		1-SD
㉙	Lug L=27 mm		3 mm
㉚	Screw, Panhead with SW (Ni)		PM 2.6 x 5
㉛	Screw, Panhead with SW/FW (Ni)		PM 3 x 6
㉜	Screw, Panhead with SW/FW (Ni)		PM 3 x 8
㉝	Screw, Panhead P tight		P tight 2.6 x 6
㉞	Screw, Panhead P tight		P tight 2 x 8
㉟	Screw, Panhead P tight		P tight 3 x 8
㊱	Screw, TP Tapping		TP 2 x 6
㊲	Screw, Panhead Tapping		PT 2.6 x 6
㊳	Screw, Panhead (Ni)		PM 3 x 8
㊴	Screw, Bindinghead (Ni)		BM 3 x 6
㊵	Screw, Bindinghead Tapping		BT 3 x 5
㊶	Screw, Special Bindinghead		BM 4 x 8
㊷	Screw, Bindinghead		GE-79D-0541
㊸	Screw, Countersunkhead		CM 3 x 6
㊹	Nut		3-DIA
㊺	Nut Flange Serrated		4-DIA
㊿	Cushion, Battery		GE-21D-5795
	Wire Kit		#918(A)
	Hardware Kit		#918(B)
	Wire Binder		PLT1M-M or BK-1

DISASSEMBLY/EXPLODED VIEW

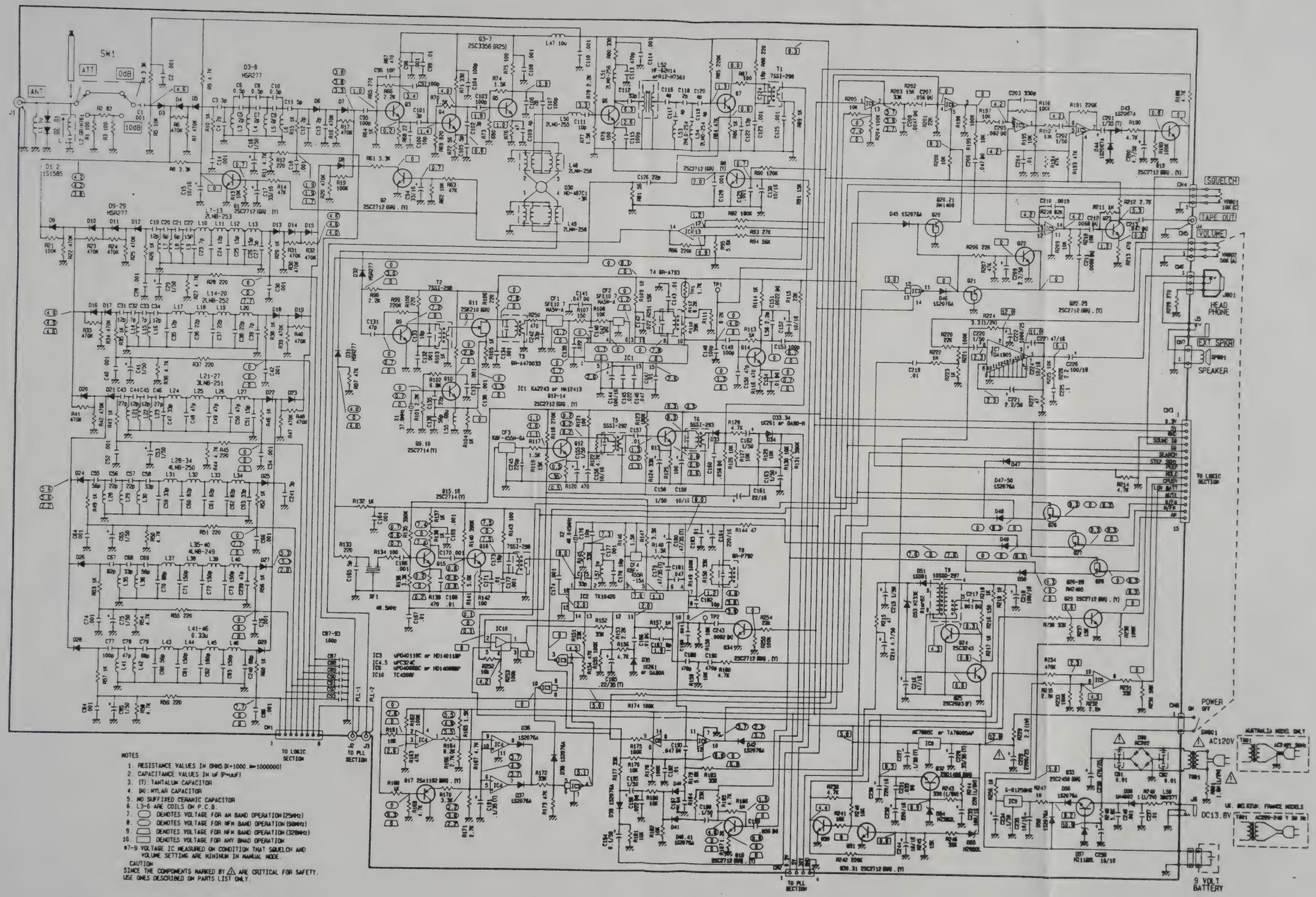



SW1
ATT
0dB
10dB
ANT
SQUELCH
TAPE OUT
VOLUME
HEAD PHONE
EXT SPKR
SPEAKER
TO LOGIC SECTION
POWER
OFF
AUSTRALIA MODEL ONLY
AC120V
DC13.8V
U.K. BELGIUM. FRANCE MODELS
9 VOLT BATTERY
NOTES
1. RESISTANCE VALUES IN OHMS
2. CAPACITANCE VALUES IN uF
3. (T): TANTALUM CAPACITOR
4. (M): MYLAR CAPACITOR
5. NO SUFFIXED CERAMIC CAPACITOR
6. L3-6 ARE COILS ON P.C.B.
CAUTION
SINCE THE COMPONENTS MARKED BY
USE ONES DESCRIBED ON PARTS LIST

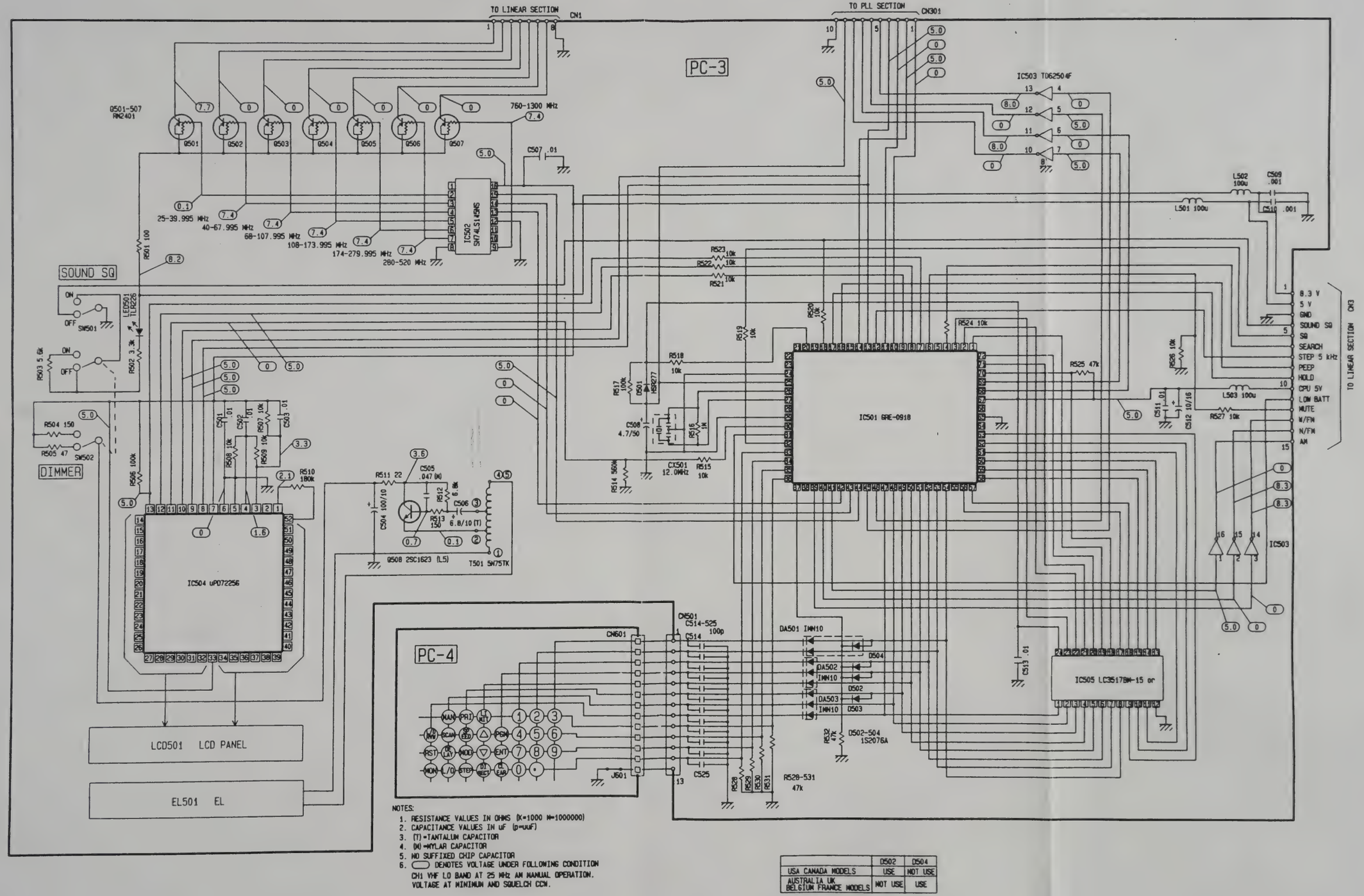
DISASSEMBLY/EXPLODED VIEW



SCHEMATIC DIAGRAM (LINEAR SECTION)


SW1
ATT
0dB
10dB
ANT
J1
D1,2 1S1585
D3-8 HSR277
D9-29 HSR277
L7-13 2LNB-253
L14-20 2LNB-252
L21-27 3LNB-251
L28-34 4LNB-250
L35-40 4LNB-249
L41-46 0.33u
Q3-7 2SC3356 (R25)
L47 10u
L48 2LNB-258
L49 2LNB-258
L50 HF-62M14 or R12-H756X
L51 2LNB-256
L52 2LNB-254
T1 7SS1-298
D30 MD-487C1
Q1 2SC2712 (GR) . (Y)
Q2 2SC2712 (GR) . (Y)
T2 7SS1-298
T3 7SS1-292
T4 BR-A793
T5 5SS1-292
T6 5SS1-293
T7 7SS1-298
T8 BR-F792
T9 10SS0-297
D32 HSR277
D31 HSR277
D33,34 1S261 or DA90-R
D35 1S261 or DA90-R
D36 1S2076A
D37 1S2076A
D38 1S2076A
D39,40 1S2076A
D41 1S2076A
D42 1S2076A
D43 1S2067A
D44 1S2067A
D45 1S2076A
D46 1S2076A
D47-50 1S2076A
D51 1SS81
D52 1SS81
D53 MV13E
IC1 KA2243 or MA2413
IC2 TK10420
IC3 uPD4011BC or MD14011BP
IC4,5 uPD4066BC or MD14066BP
IC10 TC4S66F
IC6 TDA1905
IC7 NJM4558D
IC8 MC7808C or TA7808SAP
IC9 S-8125BHG
Q11 2SK210 (GR)
Q12 2SC2712 (GR) . (Y)
Q13 2SC2712 (GR) . (Y)
Q14 2SC2712 (GR) . (Y)
Q15 2SC2712 (GR) . (Y)
Q16 2SC2712 (GR) . (Y)
Q17 2SA1162 (GR) . (Y)
Q18 2SC2712 (GR) . (Y)
Q19,20,21 RH408
Q22 2SC2712 (GR) . (Y)
Q23 2SC2712 (GR) . (Y)
Q24 2SC2243
Q25 2SC2603 (F)
Q26 2SC2712 (GR) . (Y)
Q27 2SC2712 (GR) . (Y)
Q28 2SC2712 (GR) . (Y)
Q29 2SC2712 (GR) . (Y)
Q30,31 2SC2712 (GR) . (Y)
Q32 2SC1468
Q33 2SC2458 (GR)
Q34 2SC2712 (GR) . (Y)
Q35 2SC2712 (GR) . (Y)
Q36 2SC2712 (GR) . (Y)
Q37 2SC2712 (GR) . (Y)
Q38,39 2SC2712 (GR) . (Y)
Q41 2SC2712 (GR) . (Y)
Q42 2SC2712 (GR) . (Y)
Q43 2SC2712 (GR) . (Y)
Q44 2SC2712 (GR) . (Y)
Q45 2SC2712 (GR) . (Y)
Q46 2SC2712 (GR) . (Y)
Q47 2SC2712 (GR) . (Y)
Q48 2SC2712 (GR) . (Y)

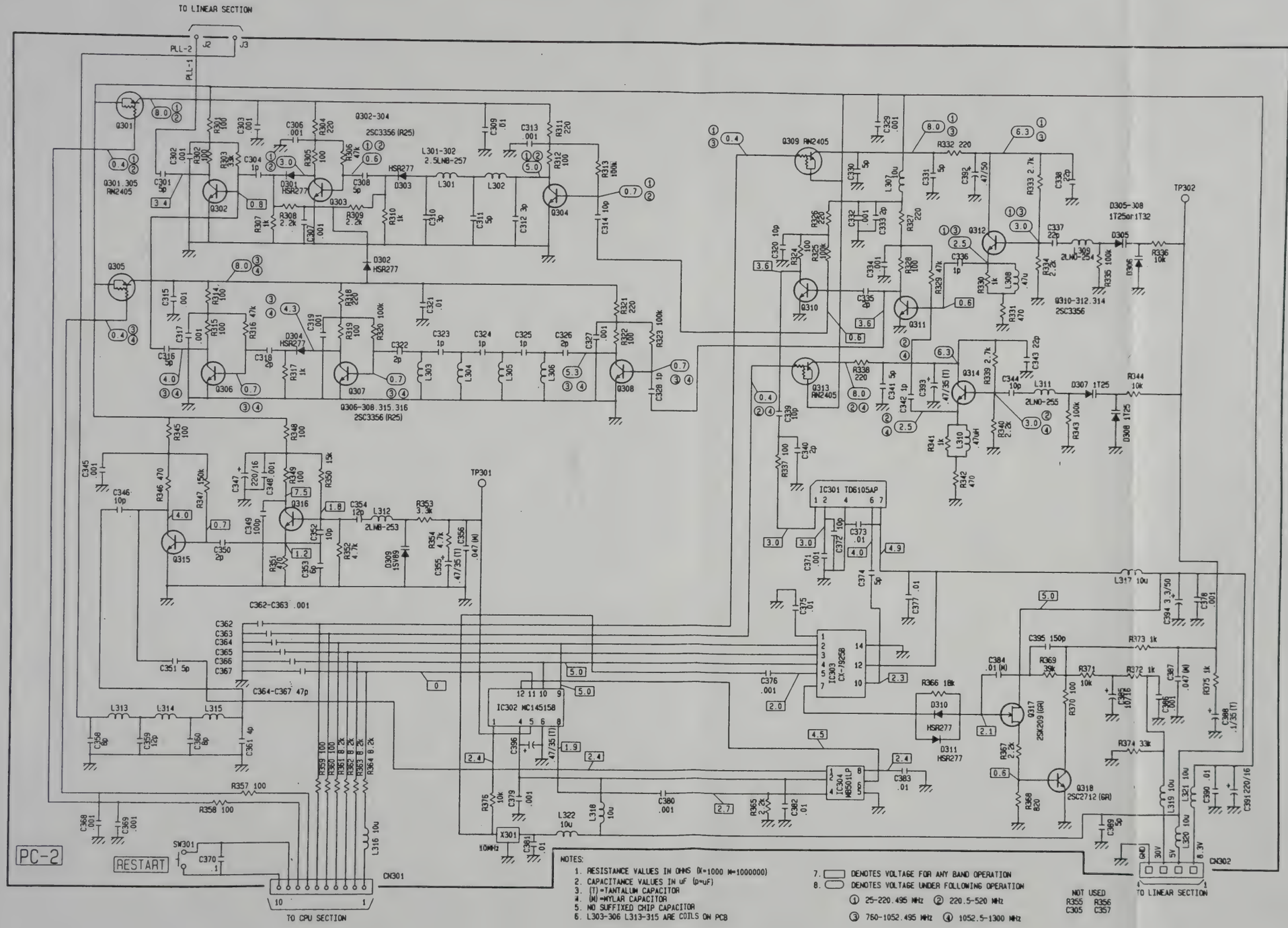
SCHEMATIC DIAGRAM (CPU SECTION)



NOTES:
1. RESISTANCE VALUES IN OHMS (K=1000 M=1000000)
2. CAPACITANCE VALUES IN uF (p=uuF)
3. (T)=TANTALUM CAPACITOR
4. (M)=MYLAR CAPACITOR
5. NO SUFFIXED CHIP CAPACITOR
6. ( ) DENOTES VOLTAGE UNDER FOLLOWING CONDITION
   CH1 VHF LO BAND AT 25 MHz AM MANUAL OPERATION.
   VOLTAGE AT MINIMUM AND SQUELCH CCW.

	D502	D504
USA CANADA MODELS	USE	NOT USE
AUSTRALIA UK BELGIUM FRANCE MODELS	NOT USE	USE

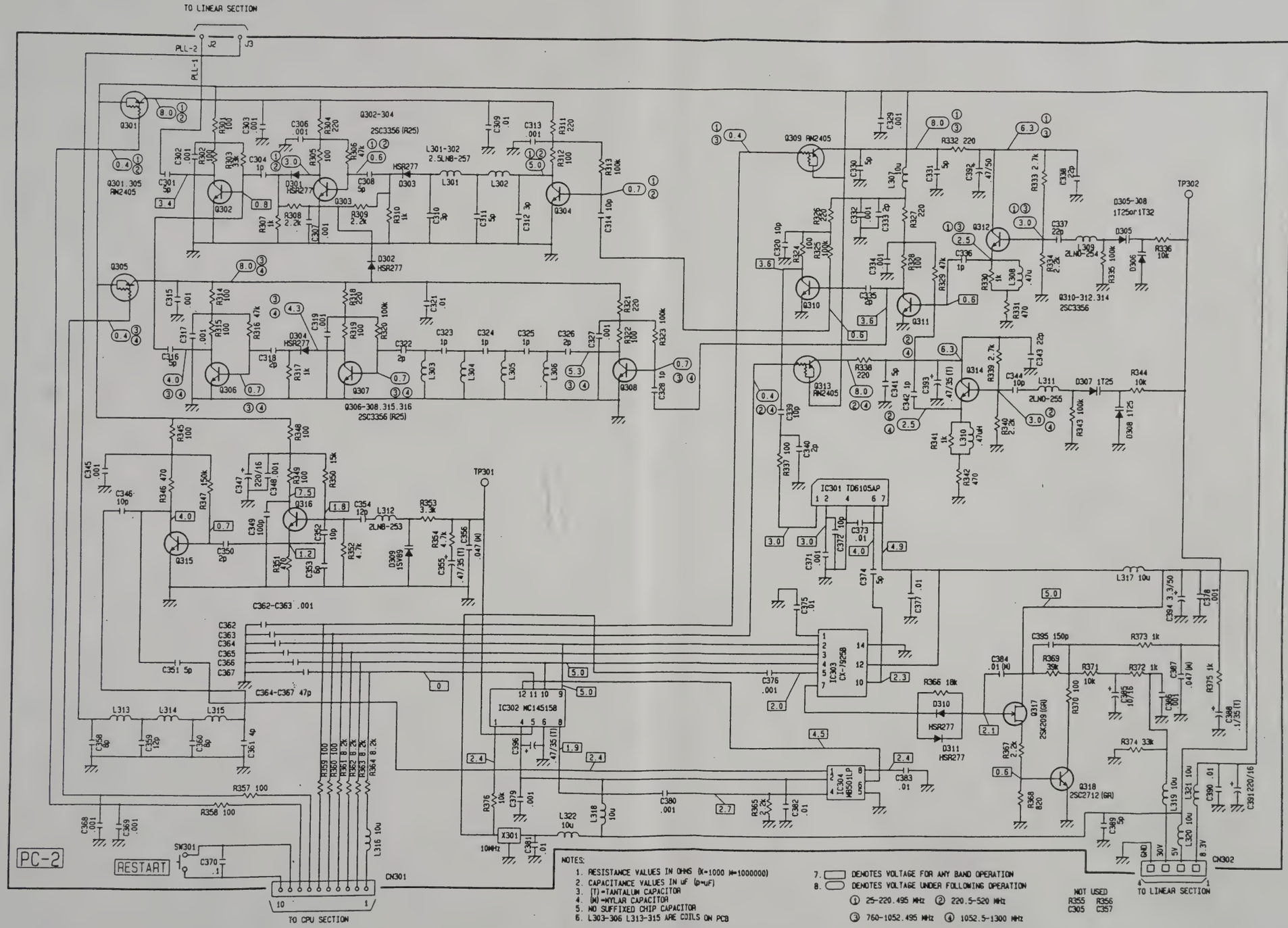
SCHEMATIC DIAGRAM (PLL SECTION)



NOTES:
1. RESISTANCE VALUES IN OHMS (K=1000 M=1000000)
2. CAPACITANCE VALUES IN uF (p=uF)
3. (T)=TANTALUM CAPACITOR
4. (M)=MYLAR CAPACITOR
5. NO SUFFIXED CHIP CAPACITOR
6. L303-306 L313-315 ARE COILS ON PCB
7. ▭ DENOTES VOLTAGE FOR ANY BAND OPERATION
8. ⬭ DENOTES VOLTAGE UNDER FOLLOWING OPERATION
① 25-220.495 MHz ② 220.5-520 MHz
③ 760-1052.495 MHz ④ 1052.5-1300 MHz

NOT USED
R355 R356
C305 C357

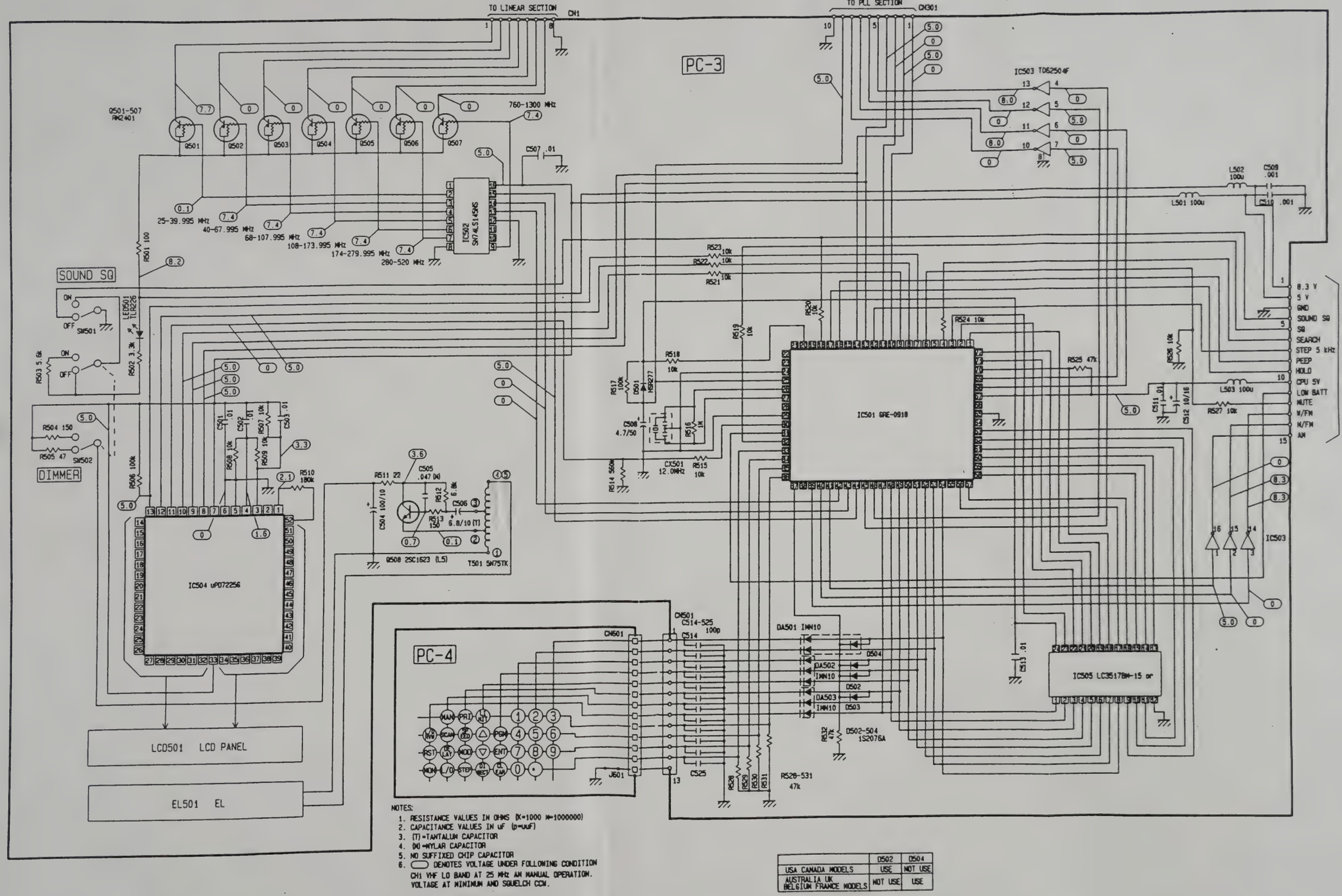
SCHEMATIC DIAGRAM (PLL SECTION)



NOTES:
1. RESISTANCE VALUES IN OHMS (K=1000 M=1000000)
2. CAPACITANCE VALUES IN uF (p=uF)
3. (T)=TANTALUM CAPACITOR
4. (M)=MYLAR CAPACITOR
5. NO SUFFIXED CHIP CAPACITOR
6. L303-306 L313-315 ARE COILS ON PCB
7. ▭ DENOTES VOLTAGE FOR ANY BAND OPERATION
8. ▭ DENOTES VOLTAGE UNDER FOLLOWING OPERATION
① 25-220.495 MHz ② 220.5-520 MHz
③ 760-1052.495 MHz ④ 1052.5-1300 MHz

NOT USED
R355 R356
C305 C357

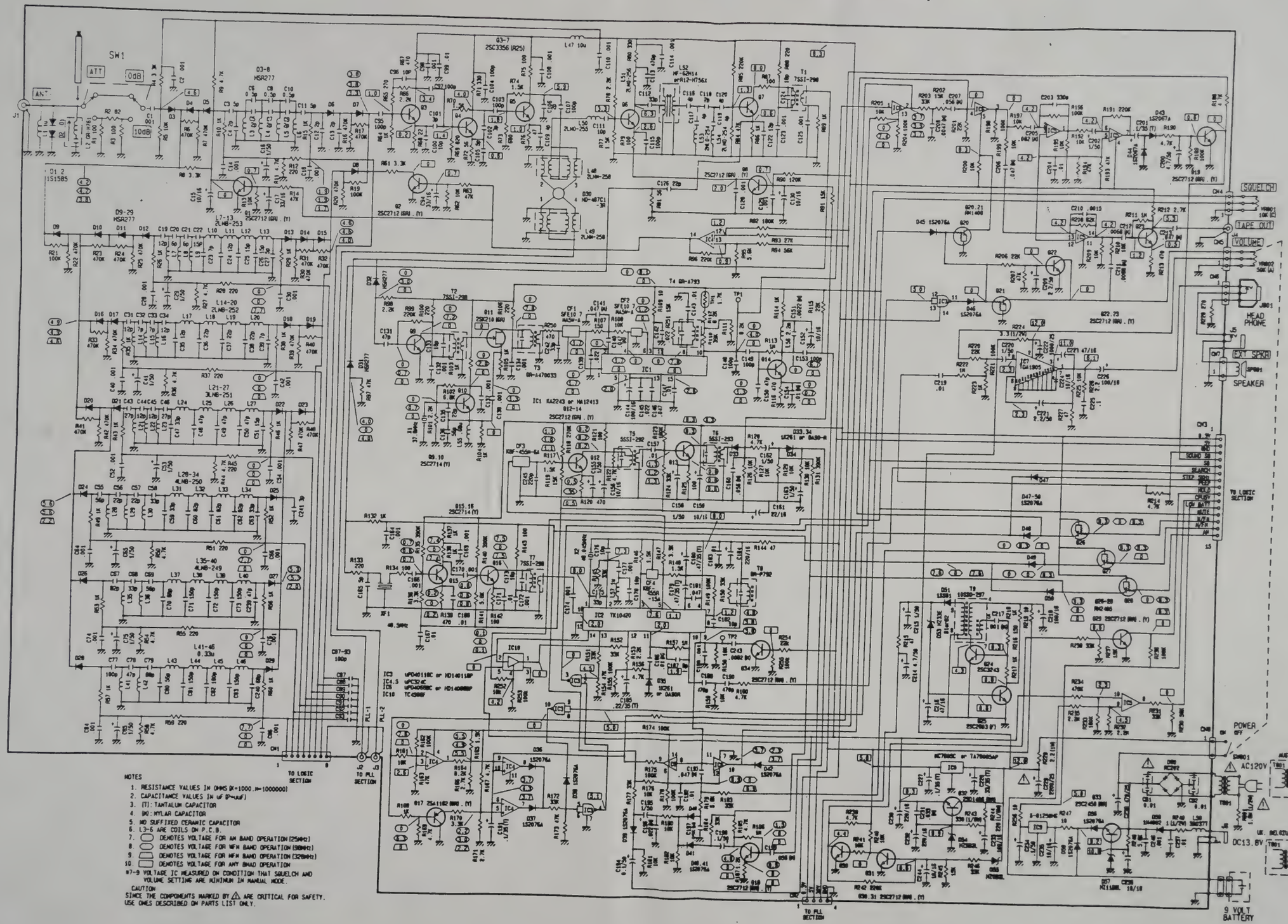
SCHEMATIC DIAGRAM (CPU SECTION)



NOTES:
1. RESISTANCE VALUES IN OHMS (K=1000 M=1000000)
2. CAPACITANCE VALUES IN uF (p=uuF)
3. (T)=TANTALUM CAPACITOR
4. (M)=MYLAR CAPACITOR
5. NO SUFFIXED CHIP CAPACITOR
6. ⬭ DENOTES VOLTAGE UNDER FOLLOWING CONDITION
   CH1 VHF LO BAND AT 25 MHz AM MANUAL OPERATION.
   VOLTAGE AT MINIMUM AND SQUELCH CCW.

	D502	D504
USA CANADA MODELS	USE	NOT USE
AUSTRALIA UK BELGIUM FRANCE MODELS	NOT USE	USE

SCHEMATIC DIAGRAM (LINEAR SECTION)

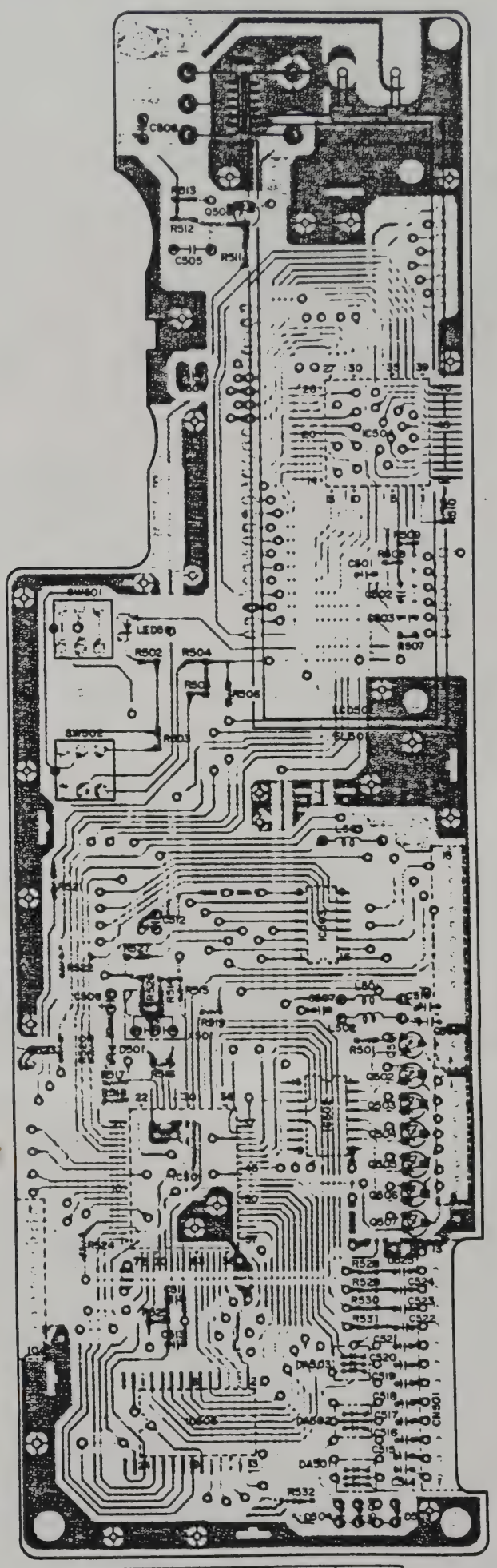


NOTES
1. RESISTANCE VALUES IN OHMS (K=1000, M=1000000)
2. CAPACITANCE VALUES IN uF (P=uuF)
3. (T): TANTALUM CAPACITOR
4. (M): MYLAR CAPACITOR
5. MD SUFFIXED CERAMIC CAPACITOR
6. L3-6 ARE COILS ON P.C.B.
7. ⬭ DENOTES VOLTAGE FOR AM BAND OPERATION (25kHz)
8. ⬭ DENOTES VOLTAGE FOR WFM BAND OPERATION (90kHz)
9. ⬭ DENOTES VOLTAGE FOR NFM BAND OPERATION (320kHz)
10. ▭ DENOTES VOLTAGE FOR ANY BAND OPERATION

#7-9 VOLTAGE IC MEASURED ON CONDITION THAT SQUELCH AND VOLUME SETTING ARE MINIMUM IN MANUAL MODE.

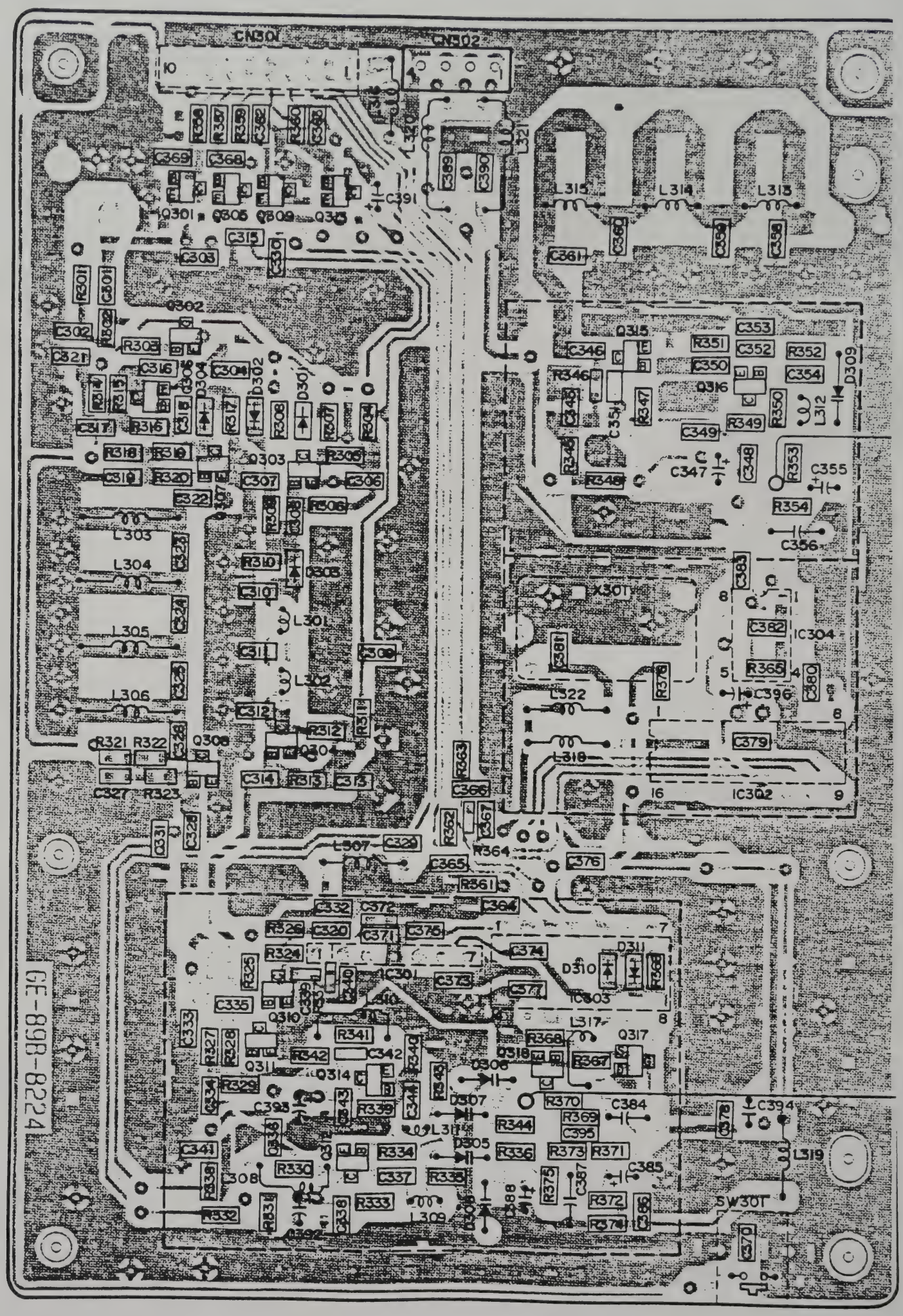
CAUTION
SINCE THE COMPONENTS MARKED BY △ ARE CRITICAL FOR SAFETY. USE ONES DESCRIBED ON PARTS LIST ONLY.

LOGIC & DISPLAY PCB (Bottom View)

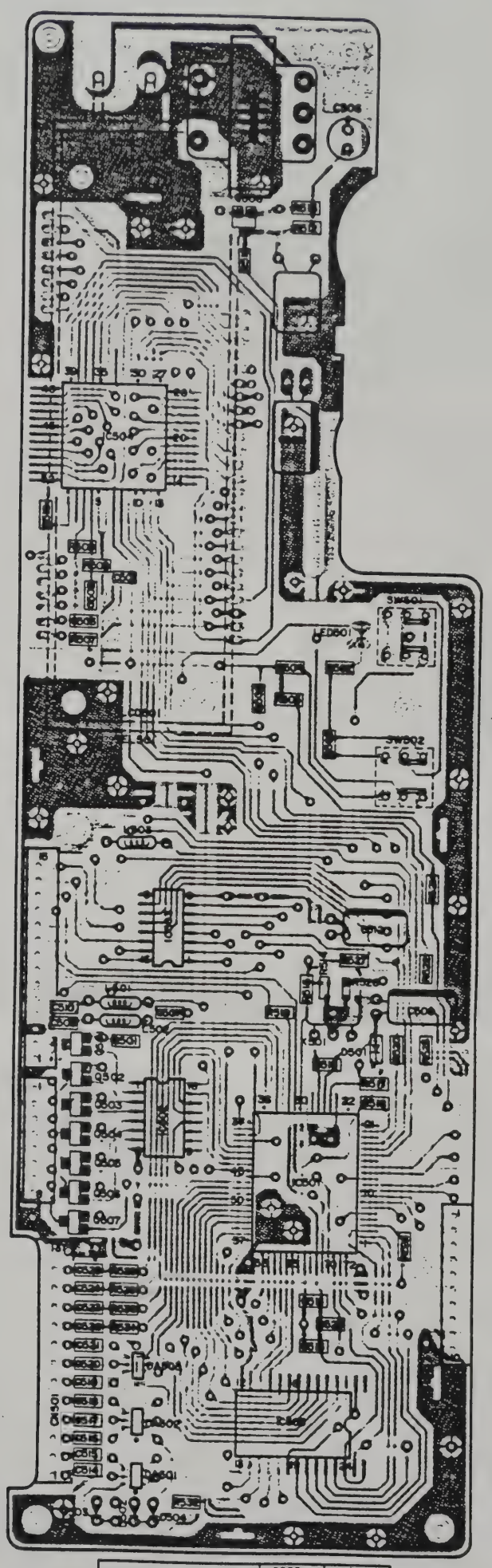


	D502	D504
U.S.A., CANADA MODELS	USE	NOT USE
AUSTRALIA, UK BELGIUM, FRANCE MODELS	NOT USE	USE

PLL PCB (Bottom View)

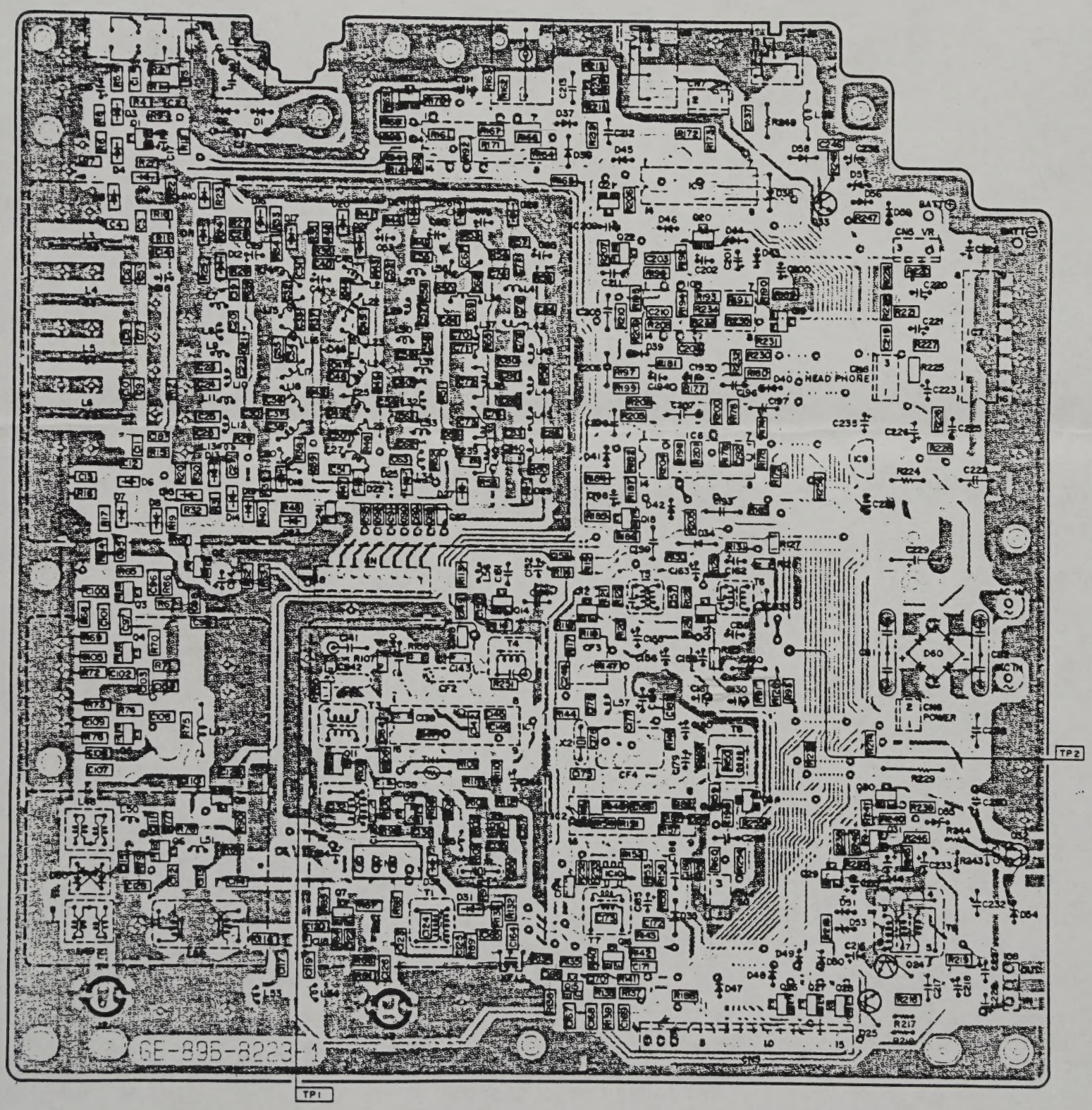


LOGIC & DISPLAY PCB (Top View)

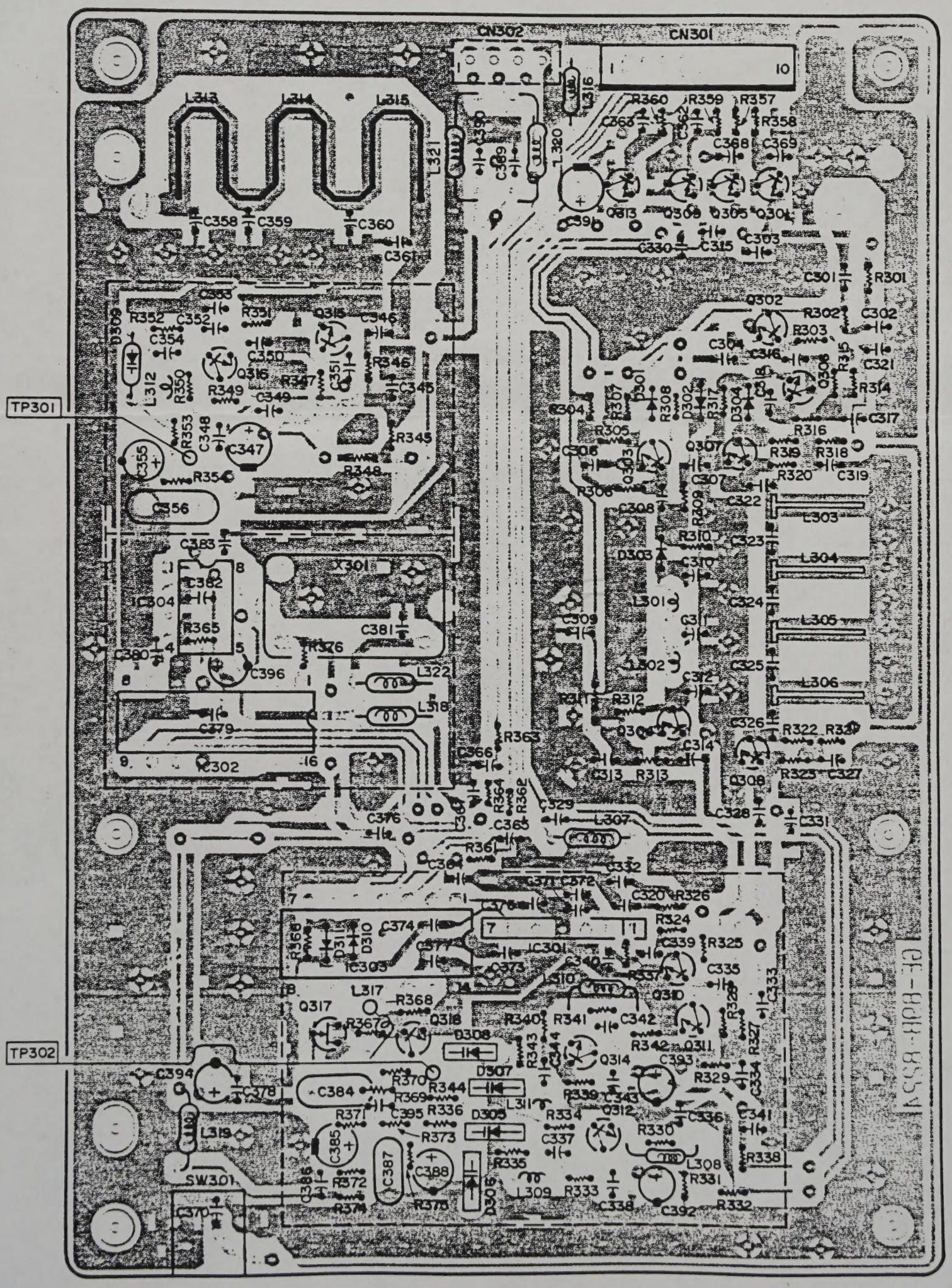
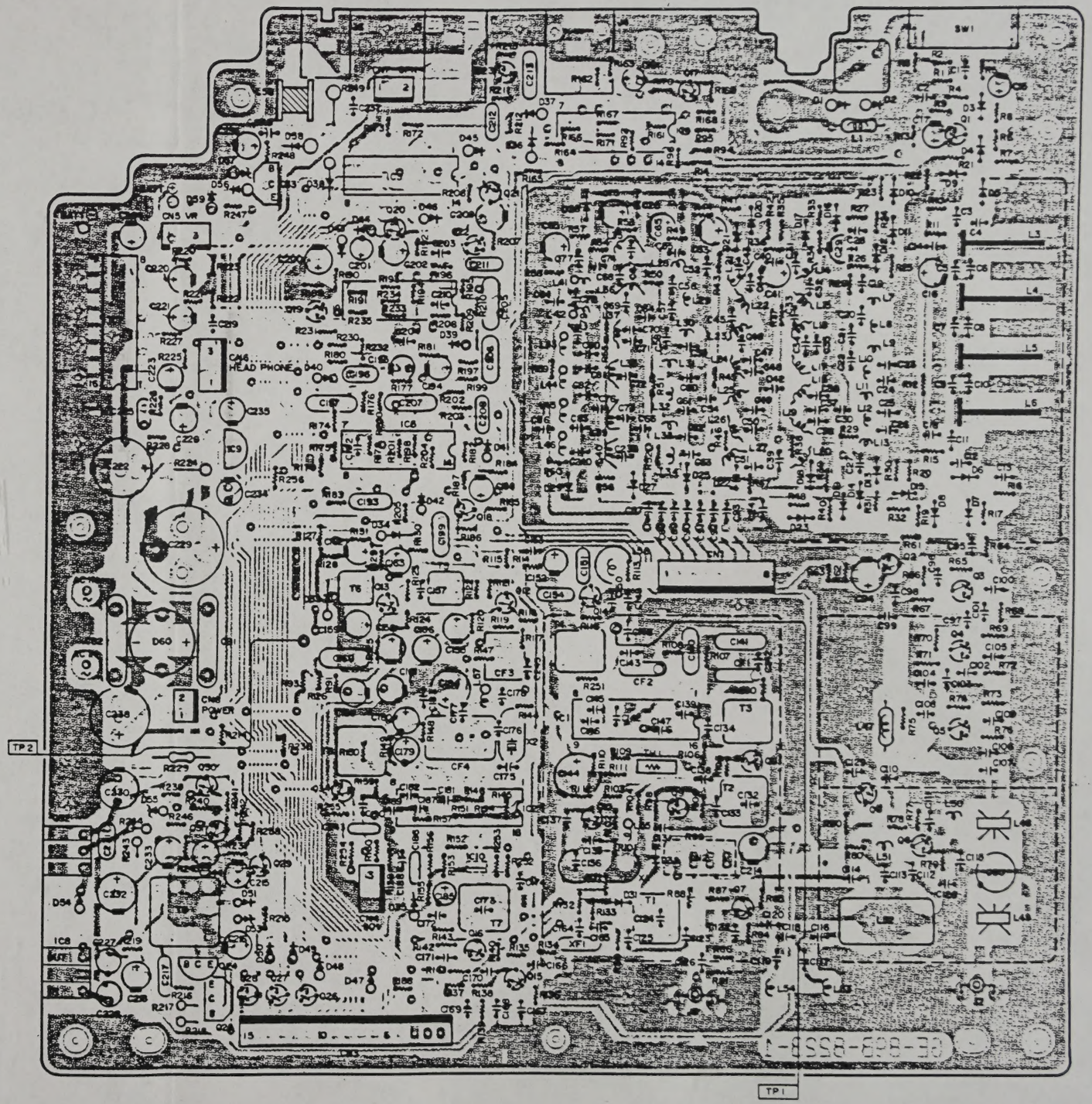
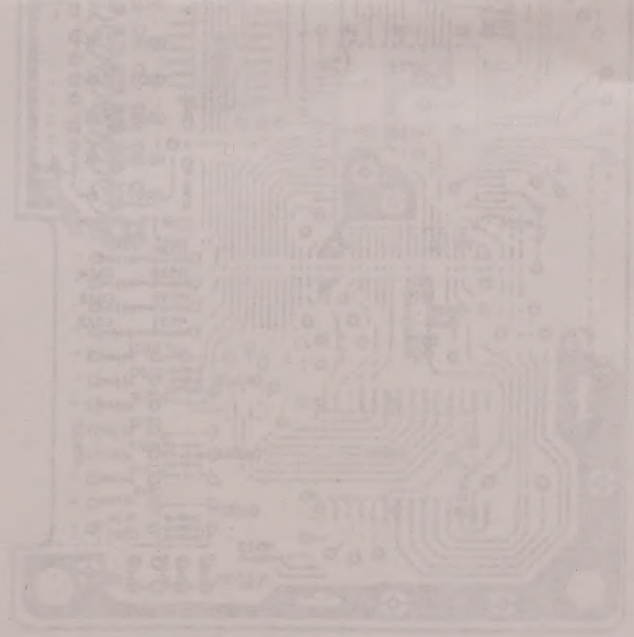


	D502	D504
U.S.A., CANADA MODELS	USE	NOT USE
AUSTRALIA, UK BELGIUM, FRANCE MODELS	NOT USE	USE

LINEAR PCB (Bottom View)



PLL PCB (Top View)



LINEAR PCB (Top View)